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AMERICAN BEE JOURNAL

JULY 1939

THE RAUCHFUSS METHOD OF SECURING LIQUID HONEY WITHOUT AN EXTRACTOR—E. L. SECHRIST

GRANULATION AND ITS PREVENTION—V. G. MILUM

THE BEES PUT THE JOB ACROSS—HELEN WELSHIMER

DROUGHT IN AUSTRALIA —R. G. MACLACHLAN

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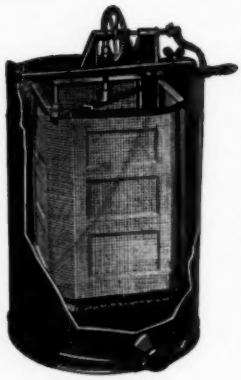

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AMERICAN BEE JOURNAL

The Oldest Bee Journal in the English Language

ESTABLISHED BY SAMUEL WAGNER IN 1861

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CONTENTS

MONTH OF JULY, 1939

Editorial ... 331

The Bees Put the Job Across —*Helen Welshimer* ... 334

Supersedure and Its Complications —*Ed. Braun* ... 337

Honey Getting—The Rauchfuss Method of Securing Liquid Honey Without an Extractor—*E. L. Sechrist* ... 341

You Can Improve Your Bees —*E. S. Miller* ... 345

Beeswax Restores Million Dollar Masterpieces—*J. T. MacMillan* ... 346

Granulation and Its Prevention —*V. G. Milum* ... 348

Is the Queen Bee a Queen in Fact? —*W. H. Hull* ... 351

Bees Started Sabastian Kresge to Five-and-Ten-Cent Fame—*Ruth Hodgson* ... 352

Drought in Australia—*R. G. Maclachlan* ... 353

A Boy's Hobby—*Wm. R. Koenig* ... 355

Meetings and Events ... 358

Crop and Market Report—*M. G. Dadant* ... 367

The Postscript—*Frank C. Pellett* ... 372

INDEX TO DISPLAY ADVERTISERS

Aeppler Co., C. W. ... 367
Allen's Apiaries ... 370
American Bee Journal, Inside back cover.
American Pigeon Journal ... 326
American Rabbit Journal ... 371
Australasian Beekeeper ... 363
Beekeepers Item ... 371
Bolling Bee Co. ... 364
Bordelon, E. J. ... 364
Brock Store ... 370
Burleson, Thos. C. ... 326
Calvert Apiaries ... 326
Citronelle Bee Co. ... 364
Clutter Publications ... 371
Continental Can Co. ... 366
Crowville Apiaries ... 365
Cutts & Sons, J. M. ... 328
Dadant & Sons ... 328
Daniels Apiaries ... 371
Davis Bros. ... 371
Dusek & Co., Joseph ... 327
Forehand, N. ... 371
Forehand & Son, W. J. ... 365
Foster-Forbes Glass Co. ... 369
Foster, Wade H. ... 364
Garon Bee Co. ... 325
Gaspard, J. L. ... 365
Gibbs, W. O. ... 364
Goat World ... 363
Graydon Bros. ... 371
Great Northern Railway Co. ... 364
Guilford Apiaries ... 364
Gulf Coast Bee Co. ... 363
Gutekunst, Emil W. ... 371
Hankammer Hdwe. Co., Phil. ... 326
Hodgson & Sons, S. P., 363, 371
Hyland Apiaries ... 370
Ideal Apiaries ... 370
Iowa Fiber Box Co. ... 365
Iverson Honey Co. ... 367
Jayhawk Boxes, Inside back cover
Jensen's Apiary Co. ... 369
Jewett & Sherman ... 367
Joy Apiaries ... 326
Kelley Co., Walter T. 364, 370
Koehnen Apiaries ... 370
Latham, Allen ... 326
Lewis Co., G. B. ... 330
Lotz Co., August, inside front cover.
McConnell, Herman ... 326
McVay, J. F. ... 365
Marshfield Mfg. Co., Inside back cover.
Merrill Bee Co. ... 327
Middle Tennessee Apiaries 365
Moore, J. P. ... 326
Muth Co., F. W. ... 327
Overbey Apiaries ... 371
Puett Co. ... 364
Root Co. of Chicago, A. I., Inside back cover.
Root Co., of Iowa, A. I., Inside front cover.
Root Co., A. I., 369, Back cover
Rosedale Hutterian Mutual Corp. ... 325
Rossman & Long ... 363
Rusch & Son Co., A. H. ... 364
Schmidt, Oscar H. ... 370
Shaw & Homan ... 364
Sines, V. P. ... 365
Spoerri Apiaries ... 370
St. Romain's "Honey Girl" Apiaries ... 371
Standard Churn Co., Inside front cover.
Standard Lbr. Co. ... 371
Stevenson's Apiaries ... 370
Stover Apiaries ... 325
Superior Honey Co. ... 363
Taylor Apiaries ... 365
Weaver Apiaries ... 326
Woodman Co., A. G., 326, 363, 364, 365.
York Bee Co. ... 365

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ALL our tin containers in the three smaller sizes are soldered with virgin tin. In this way no honey comes into contact with lead, as in ordinary solder. Prices subject to change without notice.

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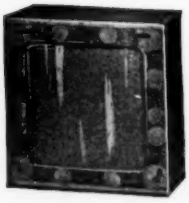
5 lb. pails, 50 in ctn., wt. 27 lbs.	3.20	3.25	3.25	3.25	3.25
10 lb. pails, 50 in ctn., wt. 45 lbs.	4.70	4.90	4.75	4.90	4.90
5 gal. cans, 16 in ctn., wt. 54 lbs.* Write for prices in carloads.	5.10	5.20	5.10	5.25	5.25
½ lb. jars, 24 in ctn. wt. 12 lbs.	.68	.72	.68	.68	.68
1 lb. jars, 24 in ctn., wt. 21 lbs.	.84	.95	.88	.90	.90
2 lb. jars, 12 in ctn., wt. 17 lbs.	.60	.62	.60	.62	.62
3 lb. jars, 12 in ctn., wt. 21 lbs.	.65	.67	.67	.67	.67

*Can only be shipped 16/c.



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American Bee Journal

Vol. LXXIX—No. 7 Hamilton, Illinois, July, 1939 Monthly, $1.00 a year

Beekeeping in Elementary Education

AN unusual program was given at Lincoln School, Atlantic, Iowa, when Mrs. Agnes Dawson, a grade teacher, presented the result of the special study of the honeybee through one full school year.

The honeybee was selected as a suitable project in nature study by Mrs. Dawson because it offered unusual interest for the children and at the same time made possible a serious study of the practical importance of the insect in our agricultural economy.

Visits to nearby apiaries were made the occasion for outings with picnic dinners when the children were accompanied by their mothers or other relatives. In addition there were movies of bees and books to be read to give the youngsters a wide contact with the subject.

Toward the end of the school year a program was prepared in which each of the thirty-five members of the class had a part. One told of the swarm, another of the queen, a third of the food value of honey, and so on, through a long list of subjects which covered the field rather fully.

The program was given on several occasions to entertain the children of other grades and finally for the benefit of the mothers of the group. In addition each member of the class prepared a booklet of considerable extent with pictures and other material relating to bees. The one which a group of three teachers selected as the best entitled the winner to a book of animal stories as a prize. Billy Thompkins was the boy who won the prize and it is evident that he is very familiar with the life and habits of the honeybee.

Mrs. Dawson has done an outstanding piece of work and an educational publishing house is considering putting her outline in such form as to make them available for other teachers. When the work appears we suggest that beekeepers generally call it to the attention of their local school teachers. Children with such training have a very real appreciation of the importance of the beekeeping industry and the value of honey as food.

—ABJ—

In-and-Outers

IT is doubtful whether there is a heavier turnover of the personnel of any serious occupation than is the case with beekeepers. While the really capable beekeeper is likely to make a lifetime job of honey production, there is something about beekeeping that attracts large numbers of persons who are temperamentally unfit for the calling.

At its present session the Minnesota legislature made considerable improvement in the state's bee laws. It is now required that bees be kept in movable frame hives. Inspector's certificates must be secured for bees coming into the state and for moving bees within the state. It is forbidden to use poison sprays or dusts that are harmful to bees. Registration of colonies is now required and a scale of registration fees has been provided:

1 to 10 colonies	$ .50
11 to 50 colonies	1.50
51 to 200 colonies	3.00
201 to 300 colonies	5.00
301 to 400 colonies	7.50
401 and up	10.00

Inspection is under the state entomologist, A. G. Ruggles, who has had supervision of the previous law. To the existing appropriation $1000 was added.

♦

The Agricultural Gazette of New South Wales, for April, contains an article by W. A. Goodacre, reporting on the light season in many parts of the province with extremely dry weather and many brush fires. He states it will take four or five years to recoup losses in the southern sections. Migratory beekeeping is the only thing which saved those who reported moderate crops.

In the Australian Beekeeper of the same issue, New Zealand is reported short 1000 tons or more and will have to import from Australia. Last year New Zealand exported 500 tons or more of honey. Southern Australia also has suffered greatly from extreme drought and heavy brush fires [See page 353].

♦

A report of H. M. Krebs, supervising entomologist for apiary inspection in California, has been received for the first quarter of 1939. It shows a total of 58,587 colonies inspected, of which 476 were diseased, or 0.8 of 1 per cent. This figure indicates what continuous work and cooperation of the various county agencies with the state agency have done to combat bee disease. More power to them!

To the office the other day came an interesting book, "Soilless Growth of Plants," by Carleton Ellis and Miller W. Swaney, published by the Reinhold Corporation, of New York City. It is well bound, well illustrated, contains 160 pages which give in detail information about nutrient solution, water, sand, cinders, etc. in the soilless growth of plants.

The book is so compelling, the idea of growing plants without soil so attractive, that one's immediate reaction is to try at once an experiment of one's own in soilless culture. The chapters, "Chemistry of Plant Life" and "Household Plant Culture," will appeal particularly to the reader who is interested in cultivating a new and delightful hobby. Beekeepers may find interesting possibilities in this type of gardening.

The price of the book is $2.75 and it may be ordered from the publisher.

♦

Students of international beekeeping will be interested in Leonard S. Harker's book, "Blazing the Trail," which is a biography of A. Z. Abushady, prime beekeeping internationalist, founder of the Apis Club, president of the Bee Kingdom League, etc. Dr. Abushady's versatility is well known; his importance in this work, however, is somewhat obscured by the intensely subjective manner in which the author has chosen to write. Carried a little further, this work could easily have become the autobiography of Mr. Leonard S. Harker.

English beekeepers in particular will find much to interest them in the book, closely associated as it is with their scene. Future biographers of Dr. Abushady will find the work an adequate record of an important period in his beekeeping activities.

"Blazing the Trail" is published by the C. W. Daniel Company, Ltd., 40 Great Russell Street, London, W. C. I. The price is 5 shillings.

♦

Attention is called to an error in line 7, page 152 of the 1937 Illinois Association report. A temperature of 93°F. should have been suggested as the optimum brood rearing temperature instead of 98°F., which is entirely too high. V. G. Milum.

♦

Gentry Dugat, of Dallas, an enthusiastic beginner in bee culture gave the Rotary Club, of Irving, Texas, an excellent talk on bees as pollinators. He was pinch hitting as a last minute speaker. Irving is in the fruit belt of north Texas. Dugat put the subject up astonishingly well for a new enthusiast. He tried, he says, "to pave the way for beekeepers among the peach and plum trees of north Texas."

Every year many new apiaries are established by persons who know little of the requirements of the bees. Too often they are misled by unusual success or stimulating enthusiasm. Once they take up the job they find that there is more to the business than merely hiving swarms and taking off honey.

An experience of severe stinging has dulled the enthusiasm of many a new beekeeper. The presence of disease has been the cause of fading dreams of many more. Poor seasons when the expected crop failed to materialize and the heavy winter losses have accounted for the loss of interest of others.

Beekeeping has its attractions and offers a generous reward for one who fully understands it. On the other hand there are the usual difficulties to be met and as is the case with other human occupations one gets only what he earns. The one who is looking for quick and easy money from bees is likely to be disappointed as the hundreds of failures clearly indicate.

———ABJ———

More Comb Honey

THERE is a trade that demands a fine article of comb honey and which will not be satisfied with anything else. To some folks extracted honey is lacking in something which to them is the mark of genuine luxury. If they cannot buy honey in the comb they do not want honey.

Unfortunately the size of this special market is constantly diminishing because so little fancy comb honey is offered in recent years. The trade is gradually being educated to accept liquid honey which can be produced at a much lower price.

It is much easier for substitutes to offer competition in the liquid honey market than where comb honey is in demand. The gradual decline in production of comb honey and the consequent change in market demand is unfortunate for the industry. We need more master beekeepers who can produce fancy comb honey for the luxury market and we need the stimulation that such an article brings to honey consumption.

———ABJ———

Some Texas History

WE note with interest the fact that Miss Thelma May Burleson has chosen the history of Texas beekeeping for a Master's thesis at the Texas University. So little agricultural history has been written it is highly desirable to record the important events while information is still available.

It would be greatly to the advantage of the industry if some student would make a similar contribution to the beekeeping industry in each important honey producing state.

From this thesis we learn that six different bee magazines have been published in the state of Texas, the first being the Texas Bee Journal published at Waco in 1885-6. The others were Southland Queen, Lone Star Apiarist, The Apiarist, National Beekeeper and later the Beekeepers Item.

The Texas beekeepers have been organized since 1877 and

appear to be among the oldest associations with continuous service to the membership within the United States.

Miss Burleson has brought together a mass of interesting information which should be preserved for the future and we hope that it can be published in some form which will make it available to all who are interested in the history of honey production in the state of Texas.

—ABJ—

Honey in Beverages

IN years gone by we heard much about the use of honey in beverages but of late it is seldom mentioned. With the enormous increases in consumption of soft drinks it would seem that a market might well be developed for some kind of honey drink.

Many years ago The British Honey Company, Limited, marketed a soft drink which they called "Mella" which was described as "retaining the flavor of honey to a marked degree and quite free from the viscous properties noticeable in many of the honey beverages."

Western citrus growers have found a market for large quantities of fruit in the form of juice. The consumption of fruit juices has increased at an astonishing rate in recent years. An even greater consumption of popular brands of soft drinks appears to have taken place.

There should be no great difficulty in finding outlets for the modest amount of honey which is produced in America if only we had some well equipped agency at work on the problem. The soft drink field would seem to be worthy of special investigation.

—ABJ—

Lower Freight Rates on Honey in Western Trunk Line Territory

ON June 1, 1939 there was effective a new classification on honey in Western Trunk Line territory. This rating is covered by Item 4418 of Supplement 30 to Western Trunk Line tariff 207-H. It is effective June 1 and will provide column 55 rating on honey, comb or strained, in glass or in metal cans in barrels or boxes, or in bulk, in tight hardwood barrels with not less than eight metal hoops, or in tight cypress barrels, capacity 32 gallons or less, with not less than six metal hoops, or in steel barrels, less than carload.

The new item will provide column 55 rating or 55 per cent of the first-class rate in Western Trunk Line territory. The present rate is third class or 70 per cent of first-class so that the reduction is about 15 per cent.

Western Trunk Line territory includes all territory west of the Mississippi River, north of a line from St. Louis to Kansas City and includes points in Kansas, Nebraska, Iowa, Missouri, Minnesota, North and South Dakota, eastern Colorado, eastern Wyoming, also points in Wisconsin not including points in Illinois Freight Association territory such as Milwaukee and Madison.

The above information was furnished us by A. C. Maxwell, Division Freight and Passenger Agent of the C. B. & Q. Railroad Company at Keokuk, Iowa. The rating will, of course, be effective on all roads in the Western Trunk line territory. No doubt the trunk line will also follow this lower rating.

In "A Preliminary Report on the Influence of Stock on Supersedure, or Loss, of Queen Bees," Contribution E-473, United States Department of Agriculture, Bureau of Entomology, by C. L. Farrar and C. W. Schaefer, Division of Bee Culture, Mid-West Field Station, University of Wisconsin, a report of fifteen pages, the authors present results of the study of supersedure of queens in package bees, recognized as a major problem to the industry. The study began in 1935 and observations have been made on more than 2,000 queens shipped north in packages or cages. The annual turnover of queens has been found to be very high. Poor queens constitute the most important problem.

We quote the summary and conclusions of the report:

"In a study of queen losses undertaken at Madison, Wisconsin, in 1938, tests were made with package bees received from 14 shippers located in seven states. The results confirmed previous evidence that breeding stock is a major factor contributing to queen losses. Only 49.3 per cent of the package queens survived the production season, and only 27.9 per cent survived as good queens. Certain lines of stock were definitely inferior to others in quality and quantity of brood and in the amount of honey produced. Stock that produced brood of low quality showed the heaviest loss of queens and failed to show a single good queen surviving the active season. In colonies headed by queens that survived the production season, the surplus honey yield, above the 60 pounds required for wintering, ranged from minus 30 to plus 250 pounds, and source-group averages ranged from 21 to 162 pounds.

"The poor quality of certain stock emphasizes the need for a general improvement of breeding stock as the first step toward reducing queen losses and increasing the returns from package bees. The heavy annual turnover of queens suggests a need for maintaining in each apiary a supply of laying queens in nuclei, to replace, without loss of brood-rearing time, those queens which fail during the active season. The nucleus plan for maintaining reserve queens, which permits a preliminary test of the queen's performance before she is introduced into a colony, is good practice. Furthermore, laying queens are more readily accepted by such colonies."

◆

During the Kansas Farm and Home Week in the early part of this year F. B. Paddock was heard to remark: "Was it a depression, a recession, or just a hell of a fix?"

The Bees Put the Job Across

By Helen Welshimer.

On the cover this month we show a corner of a five-acre field involved in this seed production job. Beehives were distributed in this field so that the bees could carry pollen from the little French to the big African, thereby creating the Red and Gold Hybrid Marigold.

IF you had been at the Burpee Seed Farms in California, last winter, you would have noticed five acres of marigolds dusted with clouds of bees.

You would have heard the low slow humming of the bees as they circled among the flowers.

Now they settled on the little French marigolds whose blossoms are red. Then they visited the large African ones—the kind that you and I know—whose color scale is entirely yellow, ranging from lemon to orange.

Back and forth, back and forth—

There is nothing unusual in this scene except that David Burpee, president of the W. Atlee Burpee Company, had assigned 600,000 bees to do man's work for him. He wanted that five acres of marigolds pollinated, and he was using the bee as pollen carrier. Every time a bee burrows into a flower, its legs and body are sprinkled with pollen. Naturally it leaves a deposit at the next visitation. The bee, knowing nothing at all of this service it performs, is a splendid pollinating agent.

Mr. Burpee was after a hybrid between the African and French marigolds. His aim was a big red marigold. He had proved that such a hybrid could be produced in a series of experimentations where a camel's hair brush had turned the trick. But when you have acres of flowers to pollinate, even the most patient workmen rebel at the hand process.

The bees put the job across.

That's why it is spot news this month that David Burpee has created a magic flower—a big red marigold.

He has gone a long step farther. He has made this flower a sturdy, annual plant for the gardens of America. When the International Flower Show was held in March, for the first time in horticultural history a large red marigold was on display.

"Burpee's Red and Gold Hybrids" these flowers are called—red and gold because the same plants will bear bright, rich mahogany-colored flowers, combinations of red and gold, or a clear, serene yellow.

"There are two species of marigolds," Mr. Burpee explains. "There's the big African one which comes only in yellow, gold and orange, and then there's the small French one which has such a solid red brilliance. The two species normally won't cross. Our problem was to get the red color of the little one into the offspring of the big yellow one."

But how? That's what everyone at the Floradale Farms wanted to know.

Then on a nice summer day in 1936 Dr. William H. Eyster, head of the Botany department at Bucknell University, motored to Burpee's

Top: Burpee's New Red and Gold Hybrid Marigold. Left: Little French Marigold. Right: Big African Marigold.

Fordhook Farms near Philadelphia. He brought along a little package. He had crossed the two species and obtained a little—very little—red color.

"It can be done!" David Burpee enthused.

"You've got to show me!" Bill Hoag, his sceptical foreman, discouraged.

"Boys, I'm going to have a large red marigold," the executive informed his staff. "There must be one certain variety that, crossed with another variety, will produce a big red marigold. We'll make experimental crossings between every variety of both kinds."

Things are done on a gigantic scale on the Burpee ranches in California, near the Mexican border, in Pennsylvania, in Idaho and in Michigan. Yet the efficiency is clocklike in its precision. The work began. The crew made 273 crossings of marigolds in this breeding for color. From them it grew hybrid seeds and made hundreds of selections.

The first big red marigold bloomed at Floradale in December of 1937, just before Christmas.

"It can be done!" the crew now chorused their boss's initial assertion.

Commercial production was the next step.

Mr. Burpee said to Bill Hoag: "Bill we have to grow five acres of marigolds this winter."

"Five acres!" the foreman exclaimed. "What's the hurry? It's easier to raise a crop in the summer. Anyway, we can't sell the seed 'til next winter."

The two men have worked together for a long time. They've managed to create the odorless marigold, known as Burpee Gold, and a list of other flower marvels. They speak frankly.

"I want to harvest the seed in time to test it during the summer of 1938. Then we can offer it for sale in January of 1939."

"All right, but it's a job to pollinate five acres. You figure it out. I don't know how."

Mr. Burpee had the answer ready. You saw it in that cloud of bees which swarmed over the field at Floradale.

First, though, he had his staff plant alternate rows of French and African marigolds. This was no perfunctory planting. He had a reason for wanting a row of the little flowers, then a row of the big ones.

He had discovered that the African marigold makes the best female parent and the little French one is a good father. However, since the African marigold often is self-productive, containing both male and female active plants, some elimination had to be done. Only the African marigolds in which the female plant was active, the male sterile, could be used. All others were removed. These marigolds that remained had to depend on the pollen which the bees brought to create new flowers. The only plant they could produce was a hybrid, which would result from impregnation with the pollen of the small French marigold.

Ten hives of bees were scattered through the field and the bees carried on. The resulting marigolds, lustrous, large and red, were worth the trouble to create them. They are proclaimed the most sensational flower of 1939. Horticultural scientists, as well as flower lovers whose understanding goes no deeper than the top soil, agree on this fact.

Besides its rich new color, the hybrid has a dozen other good points.

Let Mr. Burpee explain them. "It is the earliest of the marigolds, and it begins to bloom eight weeks from seed. Besides, it is the most profuse blooming marigold, and stays covered with flowers. It's been known to blossom for seven months, only frost ending its regime. The flowers grow to a size of nearly two and one-half to three inches which is nearly three times the dimensions of the little French marigold at its biggest. The plants are one and one-half feet tall and two feet wide."

Then, too, it will grow in any section of the United States, and the bad odor has been lost in the breeding.

All in all, the glowing new flower has enough virtues to make it a universal favorite.

One thing you should remember, when you begin to raise it. Since the flower is a hybrid, a number of African marigolds of an orange color will appear in any planting. You can distinguish them from the hybrids before the plants are half an inch high. They will have green stems. The hybrids have deep red stems. It is quite simple to separate the two.

Famous as the Burpee Company is for its miracles in marigolds, it has wrought other wonders, equally as noteworthy. One of the most brilliant of the 1939 surprises is Strawberry Festival, a new Gloxinia-flowered petunia. Its color is halfway between

Big African Marigold (female parent) being pollinated by bees after having visited the little French Marigold (male parent).

crushed strawberry and old rose. Deep crimson, much-branched veins radiate out of its plum-colored throat.

This plant stands heat and is easy to grow, Mr. Burpee says. While petunias have been a good flower for a long time, the balcony ones—those small enough for bedding—never had many colors. The giant ruffled one was gay enough but too big. Now the small one has color and ruffles, too. It blooms in great profusion, and has a seven month's lease on life.

How did it happen? Nobody knows. It's a mutation, one of those strange miracles which nature now and then performs. It leaped up from the field one day. The trained eyes of the seedsmen caught it, approved, and prepared it for universal use.

Strawberry Festival will share honors this year with the Red and Gold Hybrid. So will Creamy Crinkles, which is really a member of the Eschscholtzia family, more simply known as the California poppy.

This poppy, as you probably know, has the bad habit of spreading over the ground like an octopus, creeping and choking out other plants, taking up all the room because it is too lazy to stand up.

In the Creamy Crinkle this monopolistic tendency is gone. The plant stands erect and doesn't spread. It doesn't go to sleep as other California poppies do, either. Its crinkles won't let it close up. It's soft apricot in color and bears a double flower.

Blue Sentinel, another 1939 discovery from the Burpee gardens, is also a mutation or present.

"When we find one plant, such as this, which is different from the others, we cage it under muslin to keep out the bees and prevent pollination," Mr. Burpee will tell you. "We accept it as a gift and cultivate it. The Blue Sentinel is a verbena, royal-blue in color, with a velvety luster. Plants bear forty to fifty clusters of flowers apiece when in bloom. Since they stand erect and compact they make good edges or borders."

This year, you'll also get your first glimpse of Merriwinkle Twinkles. Winter before last, on a cruise, Mr. Burpee noticed that periwinkles bloomed in the gardens of every warm country he visited. Sun and humidity didn't annoy them. Immediately he ordered hundreds of samples of them to be collected from all over the world. He decided to breed until he found one of a new color, bug-proof, one that could stand heat when he would produce it on a large scale for American gardens. He has it now, salmon in color, and never out of bloom.

There are enough new flowers in the Burpee array this year to make a new rainbow of color. Each one is ready to be planted in your own garden for spring and summer blooming. Among the group are eleven new marigolds alone—the Red and Gold hybrids of which you've been told, first of all; then Golden Gate, Spanish Gold, Golden Glow, Royal Crown, Early Sunshine, Golden Sunshine, Orange Delight, Shaggy, Orange Supreme and Yellow Flute.

There is Violet Glory, an early aster suitable for cutting. Since the aster blooms late, the Burpee problem was to speed up its annual debut. Breeding produced a few early plants but they were floppy, with weak stems, because they grew too fast. Then along came another gift, another mutation. An aster was discovered, in 1935, blooming early on a straight sturdy stem. It was preserved and bred, and you may test it this year.

Early Sunshine, which is a chrysanthemum-flowered marigold, and Blue Sentinel Verbena are winners of the Bronze Medal for 1939 in the All-American trials. Golden Glow received honorable mention, Strawberry Festival and Spanish Gold received special recognition in these trials.

All of the new flowers will bloom easily and actively in any garden in America. If you have grown tired of flower monotony there are new varieties to plant that will provide a gaiety that your well-established perennials will welcome to the garden.

This understanding of seeds is a heritage which the late W. Atlee Burpee left to his son. The older Burpee, founder of the company, was the son and grandson of famous Philadelphia surgeons. At sixteen he was enrolled in medical school at the University of Pennsylvania. However, he was more interested in plant structure than human anatomy.

At fourteen he had been a leading international authority on poultry. In the course of this work he had planted and studied grains.

When he was eighteen he left the university and started his seed business which was to become worldwide in scope and fame. In those days men had to hunt for everything new. They didn't raise plants as they do today. As the founder of the company traveled, he was accompanied by his son David, who decided he wanted to be a horticulturist, too.

"Where would you like to go to college?" David's father queried one day.

"Either Cambridge, in England, or Cornell. I haven't made up my mind. Both have good courses in plant breeding."

"Pack your trunk, and we'll look them both over."

They did. Unknown to his father, the son acquired the complete list of books used in the courses he wanted, bought them, and studied them at boarding school along with his prescribed work.

He entered Cornell. Soon after, his father's health compelled him to leave college to take charge of the business. He was prepared.

If you love your work, if the creative urge is in your blood,—well, maybe, you can't keep from working miracles in a flower garden.

There is a fairytale of a king who saw a brilliant red flower by the roadside one day. Forthwith he sent his hundred gardeners to search for it.

"May I ask what the flower resembled, Your Majesty?" the chief gardener asked.

"A marigold, but a large one and a red one," the answer came.

"In truth, Your Majesty, we know of no such flower. But we will hunt."

Month later the flower-seekers returned, dusty and tired and disappointed.

The leader spoke again. "Your Majesty, we find no flower such as you describe. In highways and byways we have searched. Could it not have been some feat of the sun that gave the crimson glow to a yellow flower? We are agreed that not until there comes a wizard will you find that which you seek."

Now the wizard has come. Scientific understanding and great patience are his charms. He has put the crimson color in the heart of a big marigold and then, not satisfied, produced a veritable catalogue of new flowers for 1939.

[This article is reprinted from the "Christian Herald" for January, 1939, through permission secured from that magazine by the W. Atlee Burpee, Company, Philadelphia.]

—ABJ—

A Three-Point Remedy

It seems evident that the beekeeping industry is below par, as compared with other lines of farm production. Here's a three-point prescription that might be of benefit:

1. More "coals to Newcastle," that is, buying of local honey by established producers. They are the ones best situated to market the neighborhood surplus.

2. Less emphasis on long winter vacations. It was a long winter vacation that put wheat farming on the rocks a few years ago. There is something to be said in favor of staying home and attending to one's business.

3. Recognition and support of the American Honey Institute as publicity agent for the beekeeping industry, and not as an advertising agency. (Surprising how many beekeepers fail to make the distinction.)

Walter H. Hull,
North Carolina.

Supersedure and its Complications
—A *Preliminary Report*

By Ed. Braun,

Dominion Experimental Farm,*

Manitoba.

THE problems involved in the supersedure of queens in package bees have been given considerable attention in the beekeeping journals during the last few years. Attempts have been made to locate and allocate the causes of supersedure. Experiences have been outlined by beekeepers in detail, in the hope that some control measure might be evolved; and theories have been propounded which attempt to explain underlying principles of supersedure. It is not intended in this article to deal with detailed experimental results which will not be available for publication until the fall of 1939 or later, but to outline briefly four years' experimental results obtained so that beekeepers throughout Canada and the United States may be acquainted with what steps are being taken by the Dominion Experimental Farm, Brandon, Manitoba, to find a solution for this perplexing problem. It should not be inferred from the above that United States investigators are not working on this problem; they are actively engaged therein at several of the field beekeeping laboratories and universities with some of which we have been actively co-operating to the mutual benefit of both parties. Co-operative research work, however, will not be dealt with in this preliminary paper.

Twenty two-pound packages, divided into groups of four colonies each, were used in 1935; thirty-two two-pound packages in 1936, '37, '38; and thirty-six two-pound packages have been ordered for inclusion in the experiment during 1939. Data has also been obtained from beekeepers throughout the province by means of questionnaires. Further information was accumulated on supersedure in over-wintered colonies, the effect of "date of introduction" on queens, and home-reared versus queens shipped in from southern and eastern queen breeders.

*C. D. Gooderham, Dominion Apiarist, outlined the major portion of this project, and the author wishes to acknowledge his co-operation.

Package Bees

The package bees, on arrival, had their screens painted with sugar syrup, then they were stored in a cool, dark cellar until practically all the bees in the apiary had stopped flying. The temperature, when hiving started and stopped, together with direction of the wind and other meteorological data were recorded. The following paragraphs outline the methods used for hiving the package bees and queens and the subsequent treatments applied after hiving had been completed. The queens were shipped unattended unless otherwise noted.

A. The hives were prepared with one comb of honey, one comb of pollen and one comb containing open brood from an over-wintered colony. The openings in the queen cages were filled with candy, and the queen cages suspended between the combs of open brood and pollen. One-third to one-half of the bees were shaken from the packages over the combs and queen cages. The packages, with the remaining bees, were set in the open space in the hives and the whole covered with bags to conserve the heat. The hive covers were put into place, and the hive entrance reduced to three-fourths of an inch in length. Except to remove the empty packages the following day, and to see that the queens were released within forty-eight hours, these hives were not disturbed for the next seven days. The remaining seven drawn combs were placed into the hives at the first regular examination.

B. The second group of hives was prepared with two combs of honey, one comb of pollen, and seven drawn combs to each hive. All the bees were shaken from the packages into the hives, the queens were released from the queen cages and allowed to run into the hives from the reduced entrances. These hives were not disturbed for the next seven days.

C. The third group of hives was prepared with two combs of honey, one comb of pollen, and seven drawn combs to each hive. Bags were spread out on the ground at the entrances. The bees were shaken out of the packages, over the opened queen cages, in front of the hives, and allowed to run in. After the bees had entered, the hive entrances were reduced, and the colonies were not further disturbed for seven days.

D. This group of hives was prepared in a manner similar to method **A**, with the exception that one extra comb of honey was used to replace the frame of open brood; but the manner of hiving was identical to method **A**. Three weeks after releasing the package bees, two frames of emerging brood from overwintered colonies were added to each of the colonies in this group.

F. In this method the group of hives was fitted with a full complement of drawn combs, two of which contained honey and one pollen. The queen cages, stoppered with candy, were suspended between the combs in the brood chamber. An empty super was placed on top of the brood chamber and the packages of bees, with covers and feeder tins removed, were inverted over the tops of the frames, immediately over the queen cages, in the lower brood chambers. Bags were tucked into the vacant space around the packages in the supers, the covers were put into place, and the entrances reduced. The following day the packages were removed from the super and the hives were not further disturbed for seven days.

The following methods were added in 1936.

G. The hives in this method were prepared in the same manner as in method **F**. The two-pound packages were shipped without queen and the queens (attended) forwarded by mail. All the bees were shaken from the packages into the hives and the travelling queen cages suspended between the frames. With the exception of seeing that the queens were released in forty-eight hours, these hives were not disturbed for the next seven days.

H. These hives were prepared in

the same manner as those in method **D**. The queen cages were supplied with a special pollen candy and the queens supplied with attendants. The queen cages were suspended between the frames, and a small number of bees were shaken out of the packages, over the combs and queen cages. The packages, with the remaining bees, were set in the open space in the hives and the whole covered with bags to conserve the heat. Except to remove the empty packages and see that the queens were released in forty-eight hours the hives were not further disturbed for the next seven days. The remaining seven drawn combs were placed into the hives at the first regular examination.

I. The hives were prepared and the manner of hiving was the same as in method **B**. These hives were placed beside weak, over-wintered colonies. Three weeks after hiving the packages, the queens in the over-wintered colonies were removed or killed and the over-wintered colony united with the package colony, which was placed on the stand formerly occupied by the over-wintered colony.

Hiving the Bees. Very few bees flew into the air when shaken out of the packages in methods **A** and **B**, but occasionally they came out for a limited flight after being hived. In method **C** the flights were a little more entensive but little, if any, drifting occurred. These bees and queens entered the hives within 13 to 20 minutes, depending upon the temperature at the time of hiving. Two queens ascended the fronts of the hives in 1935, but they entered with the bees without much further ado. There was no difficulty or anything unusual which happened in **D** and **F**. In method **G** the queenless packages were generally quiet on arrival and remained so during the hiving period. There was no difficulty or anything unusual which need be noted for methods **H** and **I**.

Movement of Bees from the Cages. Generally, the majority of the bees moved out of the packages onto the combs during the night. Occasionally, however, it was necessary to shake the few remaining bees out of the packages the following morning. In method **F** in 1935, none of the bees moved out of the packages and the queens in the cages were severely chilled during the night. These queens were revived in the operator's pocket and inserted into the hives without further mishap. The queens were all accepted and no supersedure attempts were noted in these colonies during the summer. The practice of shaking a handful of bees out of the packages, over the queen cages, does not assure that a cluster will form around the queen cages and keep the queens from being chilled or that the bees will move from packages to the combs, especially when the packages are installed during a cool evening, or when the temperature declines rapidly during the night. The manner of installation as practiced in method **B** eliminates any danger of the caged queens being chilled. This method reduces the extra labor involved in removing the packages the following morning, allows for full complement, of combs to be supplied, and does not necessitate opening the package colony until the queen is well established in her egg laying routine. However, beginners in beekeeping, might be more successful in installing package bees by utilizing method **D** or the method of hiving outlined specifically by the shipper, which frequently accompanies the packages when shipped.

Introduction of Queens. In methods **A, D, and F,** the queens were unattended by worker bees. A small piece of queen cage candy, inserted into the cork stoppered opening, temporarily delayed introduction of the queen to the hived bees. In methods **G** and **H** the regulation sized queen mailing cage was used, and attendants were present to feed the queens en route. A hole was poked through the candy, with a nail, before the cages were inserted between the frames, to facilitate releasing the queens more readily.

Queens were lost on introduction in every method with the exception of **F** and **H** as outlined in the Tabular Summary. The queens lost on introduction were found in front of the hives in six instances and no trace was found of the other four queens. The time interval in which the located queens were dislodged from the hives varied from twelve hours to five days from the time the packages were hived. The reason for the non-acceptance of these queens cannot be readily explained. In the majority of cases of non-acceptance the queens were apparently normal from outward appearances. Occasionally they had been stung in some portion of their legs, or the wings were badly frayed, indicating that the queens had been balled after being released. However, in a number of cases where the queens had been accepted, they had been stung, as evidenced by paralyzed legs or their wings had been frayed by chewing, and still these injured queens continued to head colonies throughout the summer without any apparent ill effect. Laying queens, loose among the package bees, were never present in such cases of non-acceptance. Furthermore, a careful check for the possible presence of a virgin failed to reveal any such individuals among the package bees. In all cases of non-acceptance, where the queen had no opportunity to lay any eggs, the package colony was hopelessly queenless. In such instances extra laying queens, kept on hand to replace those not accepted, were introduced seven days after the packages had been hived and these second introductions were readily accepted. The unattended queens, during transit of the packages from the southern states, of necessity required to be fed; consequently introduction to the hived bees should not have caused any difficulty.

In method **G,** where the queens were sent attended and by mail, their introduction might have presented a problem. In this method the queens frequently were not released for two days, and then by the operator. The operator, in 1937 removed sufficient candy, forty-eight hours after hiving, to allow these queens to come out of the queen cages, when the hive bees removed the small amount of candy remaining, but found on examining the hives, seven days later, that none of these queens had been released. The candy opening was still too small to allow the queens to emerge from the cages. Eggs and larvae, however, were present in the cells of the centre combs and careful examination failed to reveal other queens present. The position of the eggs in the cells indicated that they had not been deposited by a queen. The area containing the eggs and larvae was marked and later produced bees having the same markings as the progeny of the released queens, which continued as normal heads of these colonies for the remainder of the season. Evidently the imprisoned queens had laid eggs while in the queen cages and the bees had moved the eggs and deposited them in some cells of the combs, caring for them after hatching in the same manner as eggs normally laid by the queen.

From the above observations, and those extending over a long period of beekeeping experience, it is difficult to explain why package bees should accept some of the queens and reject others for no cause apparent to the beekeeper. Queens introduced, as in methods **B and C,** were frequently laying eggs within an hour after the packages were shaken into the hive. Emerging bees were observed in these colonies on the 20th and 21st day after the packages had been hived.

Painting and Clipping Queens. To insure that supersedure did not take place unobserved, all queens in this experiment were painted on the thorax, three weeks after the packages had been hived. A different colored queen paint was used each year. The possibility of injuring them, while painting, was eliminated by applying the paint with a camel's hair brush, when they were moving over the combs. These markings made them readily noticeable and reduced the time required in examining

the colonies. Furthermore, all these queens had their right or left wings clipped before they were painted so that swarms would not leave unobserved. In the majority of the cases the wings could be clipped without catching the queen, but where they were nervous, they were caught, held gently by the thorax and clipped. Two queens in 1937 were accidentally poked with the sharp point of the scissors but no adverse results were apparent throughout the season. None of the other queens showed any outward signs of being injured due to the clipping and painting at subsequent examinations.

Brood Chambers, Supers, etc. Congestion in the brood nests of the developing colonies was avoided as much as possible by supplying a supplementary deep brood chamber, and frames of honey and pollen were exchanged with empty frames from the supers when necessary. The presence of eggs and larvae and capped queen cells were carefully recorded. An attempt to distinguish between swarm and supersedure cells was made, on the basis of the location of the cells on the comb. The incidence of actual supersedure, recorded according to the various methods, is outlined in the Tabular Summary. The annual yields of honey are also given for the purpose of comparison. It should be noted that numerous instances were recorded where larvae were present in queen cells or where fully capped supersedure cells were present in the colonies but supersedure did not take place. Several instances were noted where mother and daughter laid eggs side by side for a period of three to six weeks before supersedure actually took place.

Package Bee Questionnaire

Four thousand questionnaires were forwarded to registered beekeepers in the province, requesting information relative to the sources of their package bees, date of arrival, treatment after arrival, whether the queens in the packages were attended by worker bees or alone (unattended) in the queen cages, preparations of the hive, installation of the packages, releasing of the queens, how soon the colonies were examined after the packages were hived, the number of queens lost on introduction and the loss of queens through supersedure. Three hundred and fifty-seven replies were received and of these 73.4 per cent had purchased package bees. Approximately 22 per cent or 7,734 of the total packages imported into the Province of Manitoba in 1937 were accounted for in the replies to the questionnaire. Forty-nine shippers of package bees from seven different states in the U. S. A. were represented in the replies. Loss of queens on introduction varied from zero to 80 per cent for the different shippers with an average loss of 5.4 per cent for all shipments. The loss of queens through supersedure varied from zero to 100 per cent, with an average loss of 18.3 per cent for all shipments. The arrangement of the shipments of package bees according to states showed variations of 0-35.1 per cent in loss of queens on introduction and 6.43—25.98 per cent loss of queens through supersedure. The states from which the majority of the packages were shipped had approximately the same percentage loss of queens on introduction and loss of queens through supersedure. Grouping the shipments according to the numbers of packages in the shipments, namely 1-5; 6-10; 11-25; 26-50; 51-75; 76-100; 101-200 and 201- and upwards, showed a range of 1.1 per cent loss of queens on introduction among the group 201-upwards to 9.1 per cent among the group of 6-10 packages. The loss of queens through supersedure ranged from 13.22 per cent among the group of 6-10 packages to 27.39 per cent among the group of 101-200 packages. The group of 201- and upwards only had a loss of 13.32 percent of the queens through supersedure. Arranging of the shipments according to whether the queens in their cages were attended or unattended show practically no difference either in percentage of loss of queens on introduction or loss of queens through supersedure. A careful study of the replies to the remaining questions asked in the questionnaire indicates that supersedure of queens is not dependent upon the physical manipulation of the bees or queens when they are packaged in the southern states, nor on what date they arrive in the North, nor the manner which they are handled when received by the northern beekeeper. This final factor is particularly emphasized when the data on supersedure among overwintered and home-reared queens are taken into consideration.

Supersedure Among Over-Wintered Queens

It was considered pertinent to supplement the information obtained on the supersedure of queens in package bees with data on the incidence of supersedure among overwintered queens to ascertain whether the supersedure impulse was more predominant in package bees than in overwintered colonies. Painted queens heading colonies at the end of the season were prepared for winter; additional queens about which supersedure records had been kept throughout the summer, but which were not directly under the supersedure experiment, were overwintered. Forty-seven to sixty-eight queens were wintered over successfully during each of the four years of the experiment. From sixteen to thirty-two of these queens had headed colonies in the "Supersedure of Queens in Package Bees Experiment" the previous years, and of these from 4 to 6 were superseded during the second season. Eleven to fourteen of the queens heading over-wintered colonies superseded during the second season. The date when the queens were introduced to the colonies was compared with the date

TABULAR SUMMARY—SUPERSEDURE OF PACKAGE QUEENS—1935-1938

Year	Total number of colonies in experiment	Methods A	B	C	D	F	G	H	I	Total	Per cent
					Queens Lost on Introduction						
1935	20	0	0	1	0	0				1	5.0
1936	32	1	2	0	0	0	1	0	1	5	15.6
1937	32	0	0	0	1	0	0	0	0	1	3.1
1938	32	0	0	1	2	0	0	0	0	3	9.4
Total	116	1	2	2	3	0	1	0	1	10	8.6
					Queens Lost on Supersedure						
1935	20	0	1	3	2	0				6	30.0
1936	32	1	3	0	1	0	2	1	2	10	31.2
1937	32	0	0	1	0	0	1	0	1	3	9.4
1938	32	0	0	1	1	1	0	1	2	6	18.7
Total	116	1	4	5	4	1	3	2	5	25	21.5
					Honey Production in Lbs.						Average
1935	20	324.75	416.25	217.50	434.00	444.75				1837.25	91.86
1936	32	1100.50	654.00	1189.00	988.50	1017.00	1073.50	868.50	844.00	7735.00	241.72
1937	32	340.50	576.50	356.00	536.00	416.50	122.00	492.50	513.50	3353.50	104.80
1938	32	507.00	700.50	647.00	742.00	638.50	720.50	707.50	954.75	5617.75	175.55
Total	116	2272.75	2347.25	2409.50	2700.50	2516.75	1916.00	2068.50	2312.25	18543.50	
Average		142.05	146.70	150.59	168.78	157.30	159.67	172.37	192.69	159.86	

when supersedure actually took place; and it was found that in overwintered colonies supersedure might take place at any time from a week after introduction until twenty-four months after introduction, when the two-year-old queens were replaced with young stock. There was no significant difference between young and year-old or older queens as to supersedure tendencies. The main difference between supersedure in overwintered colonies and package bees was that in the former the supersedure queen was generally laying before the parent queen was dispensed with, and no check in the build-up of the colonies was noticed; whereas in the package colonies supersedure early in the season frequently placed such colonies in the group with low honey yields or necessitated doubling of colonies so affected to provide a reasonable return for the labor expended. Consequently, although supersedure among overwintered colonies may not affect the honey crop to the same extent as among packages colonies, the supersedure impulse is present in the former group to the same extent as in the latter.

Source of Queens and Supersedure

Queens were received at this farm from southern breeders, a Dominion queen breeding station, and a number of queens were reared in our own apiary annually for requeening purposes. The home-reared queens were reared in nuclei and full colonies. The nuclei-reared queens had to be transferred to full colonies and introduced in a manner similar to queens which were shipped in. However, where queens were reared in full colonies, the procedure was to kill the queen heading the colony and to transfer the young laying queen from the super to the brood-chamber of the same colony without caging or touching the young queen. The percentage of supersedure was approximately the same among the queens received from shipped-in sources and those reared in full colonies. These results indicate that caging of the queens and shipping through the mails does not necessarily affect the supersedure incidence of such queens as much as has generally been presupposed by many purchasers of package bees and southern-bred queens.

The problem of supersedure presents many difficulties, the solution for which may or may not be found within the next few years. A combination of scientific and practical research methods, diligently applied, and sufficient funds for furthering such work are necessary to find the ultimate solution.

—ABJ—

Death of Dr. Anderson

AMERICAN beekeepers will regret to know of the death on April 8 of Dr. John Anderson, editor of the "Scottish Beekeeper" since 1926 and one of the leading figures in British beekeeping. He was relatively young, having been only 66 at his death.

The "Bee World" for May comment thus: "As editor, and perhaps still more as a most amusing lecturer, he did a great deal of educative work, not confined to Scotland. He was well-known as a honey judge, and officiated in that capacity more than once at the National Show... By his advocacy of a search for immune bees he stimulated thought and discussion—not least among those who did not agree with him. In practical beekeeping he was one of the foremost advocates of the large hive in this country.

"Dr. Anderson possessed an unusually large number of distinctions and degrees, being M. A., B. Sc., and Ph. D.—the last-named being conferred on him by the University of Aberdeen for a thesis on the honey-bee."

On October 7, 1938, Dr. Anderson retired from his post of lecturer in beekeeping at the North of Scotland College of Agriculture. He had been on the college staff for more than twenty years and, in the words of one of his associates there had "put beekeeping on the map" in Scotland. In February we received a long letter from Dr. Anderson, commenting on his retiral, European beekeeping activities, his family, and his plans for the future. Had he lived, he would have produced some researches and writing of importance.

Dr. Anderson had been president of the Apis Club and was made a Fellow of the Apis Club for his work with the late Dr. Rennie concerning the Isle of Wight Disease.

The "Scottish Beekeeper" will continue to appear, now under the editorship of the elder of Dr. Anderson's two sons, Harry B. Anderson, at 186 Forest Avenue, Aberdeen.

—ABJ—

Package Queen Losses

After twenty years' experience with packages I think most of the loss of queens can be avoided. Most beekeepers understand how to put the bees in the hive. After they are in, they should not be disturbed until the queens are in full laying, or until there is a honeyflow.

I have received package bees with queen, in lots of fifty or more, from several states that were in express cars from two to six days. Even the longest shipments came through well. For best results the shipper should shake the bees in the packages in good weather when the old bees are out of the hive. The queens should be released by the bees in the hive.

For some reason, package bees will keep on superseding some queens as long as they are unnecessarily disturbed. If it is necessary to tinker with them, to look for eggs, or to show your friends the fine queens, cage the queens each time, so they will get over the scare before the bees can harm them.

Just try a few packages without any smoke and with no disturbance, and you will find you have learned the secret.

David Pile,
Montana.

—ABJ—

Barrett Back as Michigan Inspector

Don Barrett, with whom Michigan beekeepers are all acquainted, has been reappointed to supplant Vester Mock as chief apiary inspector for Michigan. Mr. Barrett was inspector previous to the appointment of Mr. Mock. A folder asking the co-operation of all Michigan beekeepers in getting proper appropriations from counties to provide adequate inspection has been issued by Mr. Barrett, who recently took office.

The Rauchfuss Method of Securing Liquid Honey Without an Extractor

By E. L. Sechrist,

Tahiti.

HONEY GETTING

THE Rauchfuss method of producing liquid honey without the use of a honey extractor is, simply, the production of comb honey in shallow frames, to be processed by melting, separating the wax and clarifying the honey by the use of special apparatus which preserves the original color and quality of the honey.

I have, in years past, opposed the heating of honey by melting it with the comb or cappings, but the development of equipment which will do this work and yet not damage the honey has caused a change in my attitude. When I saw tons of water-white honey of the highest quality being produced in this way without the use of a honey extractor, I began to wonder if the Rauchfuss method might not be the solution of some of the difficult economic problems which the beekeeper must meet.

Not only does this method permit the individual beekeeper to keep more bees because his labor is well distributed over the year, but it eliminates the considerable expense incurred in keeping up great stocks of extracting combs as well as the cost of extractors and their accompanying equipment. It also eliminates large losses from American foulbrood, savings which deserve serious consideration.

There seem to be few beekeepers who like, or whose personality fits them, to run a big business and to handle the labor necessary to work thousands of colonies of bees with success. They generally prefer to keep fewer colonies and to do most of the work themselves. A number of beekeepers have said that, when their colonies began to be numbered by the thousands, beekeeping ceased to be a pleasure and became just another job. For those who feel that way, the Rauchfuss method of honey production offers a fair income with continuation of the pleasure of keeping bees.

The production of honey by the Rauchfuss method is profitable because human labor is better distributed over the year than when a honey extractor is used. That is because, in the production of comb honey in shallow frames, one man can handle more bees than if honey must be extracted in order to give more room for storing honey because, all through the storing season, all he has to do is to add more shallow supers as they are needed.

When a honey extractor is used, 500 to 600 colonies is as much as one man should attempt to work during the honeyflow, and even with that number, most beekeepers will want some help with the heaviest of the work. On the other hand, outside of this busy season, he will have considerable spare time and should engage in some other profitable employment if he want a fair income, whereas, under the Rauchfuss system one man can see that a thousand colonies continue to have plenty of super room if he has made suitable preparation beforehand, and any commercial beekeeper, with proper systematization of work, can take care of at least that many colonies up to the time of the honeyflow and after it is over.

In the production of comb honey in shallow frames, which is the first step in producing liquid honey without the use of a honey extractor, supers are given the colony when needed as long as the honeyflow lasts. If colonies are managed so that there is a minimum of swarming, practically all the work to be done during the honeyflow is the giving of supers. Most of the heavy work comes later when the supers are being removed. Unlike taking off and extracting honey, this work need not be done in a hurry but can be distributed over considerable time without loss, even with advantage. At the close of the honeyflow, with many tons of honey on the hive, the beekeeper may even take a vacation and go hunting or fishing, which he would not think of doing if he had to take off honey and extract it.

And when the shallow supers of honey have been removed and stored in the warehouse, the rest of the work can be done at the operator's convenience. Nor does he need a great many storage tanks because, whenever he has an order for liquid honey, he can process as much as required and ship it, allowing the remainder to stay in the combs until he has orders for it.

Meantime, he should be able to dispose profitably of a considerable quantity of comb honey by selling to packers who want comb honey for their pack of bulk comb honey; or by cutting up the combs himself and selling cut-comb honey packaged in cellophane.

Even if sales are slow and honey crystallizes in the combs, he is put to no extra expense and suffers no losses because crystallized comb honey can be processed in the same way as it it while yet liquid.

The Rauchfuss method, therefore, can be recommended to those beekeepers who wish to produce as much honey as possible without hiring any labor, or without hiring expensive labor. It permits the beekeeper to keep as many bees as he, himself can work during the spring season. That, and not the honeyflow, will be his busiest time. There are times, during the slack season for beekeeping, when it is comparatively easy to hire unskilled labor, which is all that is necessary when taking off supers in the fall or when processing honey for some rush order during the winter. Perhaps he can even hire some beekeeping neighbor who is not busy during the winter.

Again, the Rauchfuss method makes the control of A. F. B. comparatively easy because there are no extracting combs saved to carry disease over from one year to the next. All the combs that are saved are the brood chamber and food chamber combs, and these are not moved from colony to colony if A. F. B. is a

menace. If any colony does acquire disease, it may be burned at once, and the beekeeper knows that no combs from that diseased colony are, by any chance, anywhere else in the apiary or stored in his warehouse, possibly to scatter disease. In the event of an outbreak of disease the loss will be small, and no special precautions need be taken, such as numbering all supers to correspond with their hives so that each super may be returned to the hive from which it came.

In this system all surplus honey is produced in new combs and it must, therefore be of the finest quality available. All that is not sold as bulk comb honey is put through the special melting and clarifying process, producing liquid honey of the highest grade while the large quantity of beeswax produced is also of the finest quality.

For best results in using the Rauchfuss method, almost the same considerations must be observed as for the production of comb honey in sections. There may also be regions where, owing to local conditions, this method would not be as profitable as the use of a honey extractor.

To begin with, as has often been said, a good comb honey location must be selected. It is useless to attempt to produce fine comb honey in a locality having a long, slow honeyflow, or in one having several short flows separated by intervals of dearth. Neither should comb honey be produced in a locality where propolis is gathered freely unless all the honey can be removed previous to the season when much propolis is collected. Some propolis on the combs is less objectionable where comb honey to be melted is produced than where it is sold as comb honey; but any great quantity of propolis will injure the color and quality of honey melted with it. Nor is it necessary to select a locality producing white honey when only liquid honey is to be produced; but if honey is to be sold in the comb, it is necessary to select a region producing white honey. Nectar secretion must be very rapid because all activity must be intense to produce comb honey in quantity and of good quality.

To gather an abundant supply of nectar and turn it into honey, the bee colony must be at **honey storing strength,** as discussed in the first section of HONEY GETTING. The bees must be of the proper age for the work they are to perform. A colony of old bees will not do good work in building comb and storing honey, nor can good results be expected from colonies composed mostly of young bees.

Given a colony of bees of the right strength and age, supers must not be put on too late or swarming and loss of honey will be the consequence. Obviously, all supers cannot be put on at exactly the right time. The solution, therefore, seems to be to use a food chamber in which the bees can begin to store the first honey. It remains on the hive all the year. In summer it has some brood and catches some pollen that would otherwise go into the comb honey. It also serves, to some extent, to keep queens out of the supers, no other excluders being used.

Spring work in building up the colony and keeping a **clear brood chamber** has already been discussed in the first section of HONEY GETTING. In producing comb honey it is necessary that the brood chamber does not become honey bound, therefore the **clear brood chamber** is of vital importance.

When storing has begun, shallow supers may be added as necessary on top of the shallow chamber already on the hive. Bees will occupy shallow supers more readily than sections and therefore production of comb honey in shallow frames is easier than production of honey in section boxes. Swarming is also less trouble. Adequate supering in connection with a **clear brood chamber,** proper strength of colony and immediate work in the supers will largely prevent swarming, which must be controlled if a good grade of comb honey is to be produced. Supers should never be left on any colonies which get out of **honey storing strength and condition.**

Swarm control is so fully described in the United States Farmers' Bulletins on **Swarm Control** and **Commercial Comb Honey Production,** that it is unnecessary to repeat it here.

Use of Shallow Frames and Foundation

The frames preferred have end bars 1½" wide which hold the frames solidly in place in the supers, both when frames are filled with foundation and when full of honey. They may be constructed as cheaply as possible because many of them are sold with the bulk comb honey and are not returned if the market is far away. If the market is near by or if the comb honey is melted and not sold, the frames may be more substantially constructed. A cheap super or shipping box is used when bulk comb honey is shipped and supers and frames are not returned. If propolis is not too abundant, these supers of comb honey may be shipped without scraping and cleaning the frames.

A very thin grade of brood foundation may be used, thin super foundation usually being too delicate for use in such large sheets. If the honeyflow is good, there will be no excessive midrib in the comb honey.

The foundation is best attached to the top bar of the frames with hot wax in any way preferred by the operator. It must be well attached along its whole length to prevent any breaking down of the foundation.

The Rauchfuss brothers use a very ingenious hot-plate machine which melts the foundation the full length of the sheet and attaches it to the frame at one operation. It is on the same principle as the hot-plate machine for fastening foundation in sections; but, because it is so much larger, it must be better made mechanically. For instance, the edge of the hot plate is of steel, fastened to copper, and this edge must be both horizontal and level, with a slight depression just back of the edge at the point where the foundation rests on the plate when it is being melted. This slight depression is thus always filled with melted wax which gives a good body to the sheet of foundation where it touches the wood. It would be too difficult for most beekeepers to make such a foundation fastener, although it seems a simple matter for the Rauchfuss family, who have many ingenious inventions to their credit.

Rauchfuss Hive Equipment

While it is not necessary to use Rauchfuss hive equipment in the production of shallow frame comb honey, yet they have developed hives which are worth considering.

The bottoms are made the same size as the hives, of ½" unplaned stuff, with ⅜" or half inch cleats on both sides except the entrance space. These are dipped in boiling linseed oil. Covers are made with the usual rim of ⅞" stuff with a ¾" board nailed on the frame. Blocks of ⅞" stuff in each corner provide that much space between the outer and inner covers. On top of the cover is nailed a piece of galvanized iron not quite as wide as the roof board and lapping down over the ends an inch or so below the end of roof boards. At each side of the cover and flush with the edge of cover, is nailed a lath. The joint between this and the iron is filled with roofing cement, and all is well painted after the iron has weathered. Inner-cover holes are left open for ventilation. All supers and bodies are dipped in boiling linseed oil and afterward well painted. Supers six inches in depth are preferred.

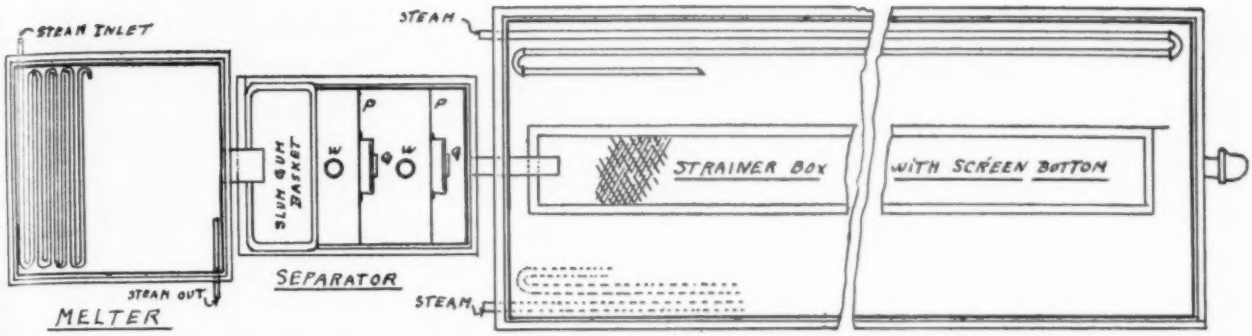
Apparatus Used In the Rauchfuss Method

The apparatus used in the **Rauchfuss method** of processing honey is:

(1). A honey melter in which is melted all shallow frame comb honey not sold as comb honey or which begins to granulate, as well as any low grade or granulated section comb honey.

(2) A wax and honey separator.

(3) A liquefier and heating tank



which also serves for liquefying 60-lbs. cans of granulated honey.

(4) A strainer and small storage tank.

The sizes of the apparatus shown on the drawings are only approximate. I do not have the exact measurements. When I saw the apparatus it was still undergoing changes to perfect it.

Honey Melter

(1) The melter is a box two feet square, made of wood and celotex so as to give good insulation. It is lined with tin. Do not use galvanized iron for this because the wax soon takes off the zinc and then the iron will discolor the wax. The box has two steam grids as shown in the drawing. The upper one is made of tinned pipe and is set level in the box. It is removable for cleaning and for cleaning the tin floor below it. This grid cannot well be too large. A valve controls the steam, more or less being admitted according to the amount of comb honey which is cut into the melter.

There should be unmelted comb on top of this grid as long as the melter is in use. As soon as the grid becomes partly uncovered, the valve should be closed, shutting off the steam to avoid scorching the honey. Drops of honey on the lower side of the pipes will soon become overheated unless honey is constantly flowing down. Provision must also be made for carrying off condensed water or escaping steam.

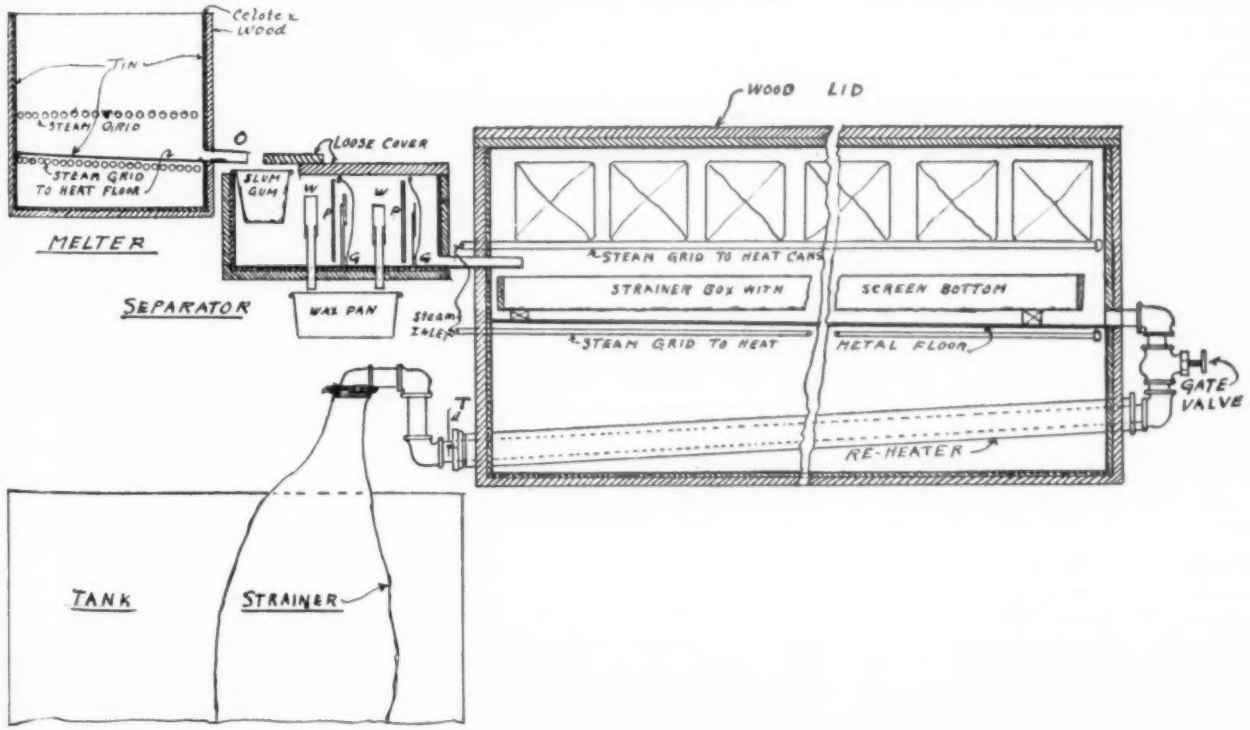
Below the sloped tin bottom is another heater coil which heats the tin and completes the melting begun by the upper grid. This lower grid may be made of galvanized pipe and should also be of large capacity. It is controlled by a separate valve and only enough steam should be admitted to complete the melting of the wax, the amount of steam varying with the speed at which the apparatus is worked.

The cut honey falls on top of the upper steam grid and the wax is partially melted there if the honey is warm, or almost completely melted if the honey is cold or partially crystallized. The mixture falls to the sloped bottom which is kept hot by the lower steam grid. It then flows into the wax separator.

As used by the Rauchfuss brothers, this melter and wax separator function excellently, but I see no reason why an "under feed" melter, like the Brand, would not be satisfactory if large enough and supplied with plenty of steam. In this case, no special wax separator would be necessary as the separating would be done in the body of the melter. It might be possible, however, that the rapid flow of honey through the melter would carry some wax over with it, as the Rauchfuss separator may do if only one separating partition is used; then some form of wax separator would have to be used.

The Wax Separator

(2) The wax separator is also of tin, heavily insulated with wood and celotex, like the melter. It has two main partitions (P. P.) with openings at the bottom as shown in the drawings, through which the honey flows into the next compartment. But, first, it meets with a supplementary partition extending to the height required for good separation



of the wax from the honey. Each supplementary partition may well have a sliding upper part which may be raised or lowered until the correct overflow level is found, when it may be soldered permanently in place, the operation afterward being controlled by raising and lowering the sleeves on the wax tubes.

At the bottom of each of these supplementary partitions are small openings or gates, closed with slides (G.G.) and opened by wires which reach to the top of the tank. Opening these slides permits the tank to be drained slowly at the end of a day's run, the honey outlet (O) being level with the bottom of the separator.

Wax outlets (W.W.) are of pipe extending through the bottom of the tank and with their tops at the correct height to do the work. It is well to have a sliding sleeve on the outside of each of these outlets whereby the wax level may be raised or lowered as desired, the honey level remaining fixed after the correct point has been determined by experiment and the supplementary partitions soldered in place. These wax outlets, being in the bottom of the box, are always hot and never clog with cooling wax. The wax pan is placed beneath the separator as shown.

Two of these partitions and two wax outlets are used in the wax separator because, with the rapid flow of honey, it was found that some wax was carried into the second space.

I see no reason why a "slumgum basket" such as used with the Severin type of separator, would not be a valuable addition here. I have added such a basket in my drawing of the Rauchfuss separator.

The mixture from the melter would then first run into the basket and through that into the wax separator proper. The function of this basket is not only to catch any waste and propolis, but to consolidate the drops and globules of melted wax, many of which would otherwise pass through with the honey, causing that objectionable cloudiness which is difficult or impossible to remove from the honey after the wax which causes it has cooled. Re-heating and cooling does not remove it but, for practical purposes, there are no drops or globules of wax left after the mixture passes through the slumgum basket.

Normally the separator will function well with each wax outlet about an inch higher than its following supplementary partition, but it is well, except when draining the separator at the end of the run, to have the wax tube two or more inches higher, thus holding a larger body of wax in the box. Keeping the honey level low and the wax level high aids, as does the slumgum basket, in clearing the wax and honey and in consolidating the droplets of wax. This is of considerable importance if the honey is to be sold at retail in glass. If consumed as granulated honey, the complete removal of these microscopic bubbles or spheres of wax is not so important.

Honey and wax should not stand in the separator over night. The slumgum basket should first be lifted out, slowly, to permit draining, and emptied while it is hot, the slumgum being remelted later if it contains worth-while wax. Then the gates in the supplementary partitions should be partially raised and the box slowly emptied. This last mixture probably will require careful straining and settling. After being allowed to cool over night it may be run through the melter again the next day.

Liquefier and Heater

(3) This piece of apparatus serves two purposes. It is made large enough and deep enough to accommodate as many 5-gal. cans of honey as it may be desired to liquefy at one time. The one shown is 10 feet long and takes 18 cans. It is built on exactly the same principle as the honey melter just described, in that it has an upper and a lower steam grid, and a sloped bottom just above the lower grid. Each grid is also controlled by a separate steam valve. There is also a separate steam inlet for the re-heating apparatus which, for the sake of economizing space, is housed below the lower heating coil. The lining of the box and the pipes may be galvanized iron because it does not come in contact with melted wax. It is jacketed with wood and celotex to conserve heat and should also have an insulated cover, hinged, to lift up.

As in the case of the melter, the grids should be of ample size. They should be so made that additional pipe can be added if necessary, or an additional grid can be placed along one of the vertical sides of the box.

The sloped bottom has an outlet into a two inch galvanized pipe which is connected by elbows, short nipples, and a gate valve, with the re-heating element. A gate valve should be used here in order to allow the full two inch opening. Both the sloping bottom and the re-heater have a slight slope, just so that warm honey will flow readily. The two-inch pipe is jacketed, as shown in the drawing, by a four-inch pipe which is supplied with a steam inlet and valve and is provided with drain for condensation.

The lower end of this 2-inch pipe runs through a bushing and packing on the 4-inch pipe and thus may expand or contract without leakage. Two elbows and a nipple form a gooseneck on the lower end of this pipe, while a third elbow provides a convenient place for tying the neck of the strainer bag to the end of the outlet pipe. This gooseneck is kept turned up at all times except when the heater is being entirely drained. The pipe is at such a slope that when the gooseneck is turned up the pipe is kept completely filled with honey. Thus scorching of honey, as might occur with the pipe partly empty, is prevented.

A thermometer (T) located in the lower end of the pipe shows, at all times the temperature of the honey as it passes through. The temperature to which the honey is heated is controlled by the rate of admission of honey through the gate valve and by the amount of steam admitted into the 4-inch pipe jacket.

The honey tank in which the strainer hangs may be directly beneath the outlet pipe of the re-heater and the sack may be attached directly to the gooseneck, or the pipe may be dropped to a lower floor where the tank and filling apparatus may be placed.

When this apparatus is used in processing comb honey, a long shallow box with wirecloth bottom, or with cheesecloth bottom if the honey will pass through it fast enough, is set on the sloping floor, being raised up from the floor by pieces of wood. This is sloped in the same direction as the floor or in the opposite direction as gives best results with the quantity of honey passing through. This long strainer box catches any foam, or any foreign matter that may have passed through the wax separator—probably not very much. The clean honey runs through this screen and along the warmed floor of the box to the outlet into the re-heater.

When the apparatus is used as a honey liquefier, the cans of honey are laid on their sides on top of the upper steam grid and the long strainer box is placed on the floor with its slope opposite to that of the floor, the slope being slight and just enough to cause the partially melted honey, as it runs out of the cans, to distribute itself well over the screen bottom. Thus any honey not melting and flowing through immediately, moves slowly toward that end of the sloping bottom which is farthest from the honey outlet.

The melting honey flows through the screen, foam and any waste remaining on it. Then, as the honey flows slowly along the sloping bottom, any remaining crystals have a good chance to be melted.

After flowing out of the honey outlet, the honey enters the re-heater—the steam jacketed pipe. Any remaining crystals are there melted and the honey heated to the exact temperature desired.

It is difficut to give the exact amount of pipe required for the steam grids because of differences in

size and insulation of the box, the room in which it is used, and the temperature of honey going into it. Plenty of pipe will do no harm. If too little is used more can be added.

Strainer and Storage Tank

(4) A large storage tank is not desirable because the honey should be run out at once into smaller containers which can be cooled quickly.

In straining, a flour sack or a double cheesecloth sack is used, tied over the end of the outlet pipe and hanging in the tank below. The sack should extend to the bottom of the tank but should not be loose enough to reach to the outlet from the tank and clog it. When the sack no longer strains freely, it is simply taken off, hung up over the tank to drain, and a clean sack put in its place. The sack, by breaking the drop of the stream of honey into the honey already in the tank prevents the formation of troublesome air bubbles.

Filling Retail Packages

Much of the liquid honey produced by the Rauchfuss brothers is sold in small tin cans or pails. They use an automatic filling device which is quick and accurate, filling 5-pound cans as fast as they can be taken away and capped. This device can be set for any size package, the can being set on a scale which, as soon as depressed to a certain point, trips the mechanism, automatically closing the gate. It is so adjusted that the amount of honey in the air between the gate and the can will fill the can to the exact weight required. The honey must, however, continue at the same temperature. If permitted to grow cold, the cans will be too heavy because of the greater weight of honey in the air when the valve closes. This constant temperature is easily kept by the use of the reheater and immediate filling of cans from the small storage tank.

The pressure of the flow must also be the same, regardless of the honey level in the tank, and this is accomplished by the use of a small subsidiary tank holding, say 5-gallons, which is always kept full from the main tank by means of a float and a check valve. Of course, this automatic filling device is not a necessary part of the processing apparatus, but it does make for quick and accurate work.

Filling 5-Gallon Cans

If 5-gallon cans are filled with hot honey, they should never be set in piles before they are cold. Indeed, if the honey is water white and it is desired to keep it unchanged, it is well to have a large flat tank full of cold water, or iced water, into which the cans may be set to cool quickly because some honeys in quantities no larger than 5-gallons will change appreciably if cooled slowly, as in hot weather. If, however, comb honey is melted and cans filled during the cold weather, as may well be done when using the Rauchfuss method, the cans may be set, separately, in a cold room or out of doors until cold. Even five pound cans should not be packed in their cartons until they have become cold. Otherwise, the quality of some honey will be changed.

———————ABJ———————

You Can Improve Your Bees

By E. S. Miller,

Indiana.

Usually there is to be found in a yard of any considerable size, one or more colonies of outstanding superiority. Let us suppose that by grafting cells, all queens are bred from this better stock. Most of these will, of course, mate with common drones, but a few, perhaps, with drones from the best colonies, especially if drone comb is supplied them while it is restricted in all other colonies as far as possible. Then, let the same plan be used the next year, breeding only from the best. Queens then will mate with drones of the original stock since the drone is the offspring of a single parent, the queen. If this plan is continued over a number of years, a marked improvement will be noted in the characters sought. Much of the tendency toward swarming may be eliminated if the queens are bred only from colonies that do not swarm. Color and temper of the bees may be improved and the vigor and productivity of the colonies increased. If determination due to inbreeding is feared, drones may be reared in other of the better colonies or queens may be purchased from other breeders of superior stock and liberally supplied with drone comb.

In making a selection of breeding queens, color would be a worthwhile consideration though not the prime requisite. Color enables one to determine more readily the purity of the stock. The lighter strains of Italians usually are more quiet and more easily handled than are the darker bees, especially if there is even a slight admixture of the latter with hybrids as is often the case. While it is well known that some strains of goldens are of little value as honey gatherers and lack colony strength and vigor even under favorable conditions, yet yellow bees with improved characteristics can and are being bred equal to any of the darker bees and superior to most of them. Also, there are some strains of yellow bees that are even crosser than the blacks, but in breeding for better bees it is important that the start be made with the best stock obtainable and then to continue its improvement.

It is not advisable to choose as a breeder a dark Italian queen or one whose drones are black or whose bees are ugly in temper or not uniform in color simply because the bees are good honey gatherers. It should be borne in mind that although the first cross between two races or strains may result in better producers than either parent stock, the second cross generally is quite inferior. Selection on the basis of production, alone, usually results in failure. In other words, desirable qualities are not often transmitted to succeeding generations of hybrids.

By using the grafting method, one can be sure of the best results, for the queens can then all be reared from the best and all others eliminated. It would be advantageous to move to an outyard all colonies that do not show the desired characters and to restrict queen-rearing to a yard reasonably well isolated from all other bees. Absolute isolation may not be obtainable, but even so, much progress can be made.

The argument that queens reared in grafted cells are inferior or lacking in quality has no real basis in fact. Of course, in the process of grafting, larvae may be injured if proper care is not exercised. If old larvae are used or if queens are reared under adverse weather conditions, results may not be satisfactory. These errors can be avoided. The vitality of a queen of any given strain is determined chiefly by the temperature within the hive at the time the larva is developing and by the amount and quality of the food with which the larva is supplied. Those who demand early queens reared under adverse weather conditions, should not expect them to be as good as those reared in warm weather and during a honeyflow. The early queens are the ones most often superseded.

Beeswax Restores Million Dollar Masterpieces

By J. T. MacMillan,

New York.

NOW would you like to find a quarter of a million dollars? Or would you settle for a thousand? These things do happen now and then! When rummaging through dusty trunks and heirlooms, or in old attics, there is sometimes brought to light an old master or a valued etching. It occurred a short while ago when a Whistler etching worth a thousand dollars turned up in a gift collection of old books and furniture at a Salvation Army depot.

Oil paintings are among the most valuable objects in the world. Many have sold for sums in excess of a million dollars. The sale or removal from some countries of an old master can mean a lifetime in jail for the offender. Napoleon knew their worth. Many of his army campaigns resulted in the enrichment of Paris' famous art museum, the Louvre, to the extent of 30 or 40 magnificent oils. On defeating the Italian Duke of Parma, for instance, he exacted a tribute of 20 paintings by well-known artists.

Art classes at Yale University for years had been taught to study the masterly technique of a Giorgione picture owned by the University. It proved to be, instead, a painting by an even greater artist of the 15th Century, the famed Titian of Venice. X-rays disclosed that the work, brush strokes and technique were truly characteristic of Titian.

The most recent find happened in England. There a painting was uncovered, of "Christ and His Disciples at Emmaus," done by the Dutchman Jan Vermeer in 1660. It sold for 500,000 dollars.

While the actual discovery of the works of noted artists is likely to be for the art expert and the X-ray, the work of uncovering the hidden beauty and color of oil paintings remains for — beeswax! Apparently, beeswax is the nonpareil wax of art workers everywhere.

In the case of the Pourbus painting, E. W. Forbes, Director of the Fogg Art Museum at Harvard University, suspected that here was a painting somehow in disguise. His suspicions were confirmed by the X-ray. The portrait had been dandified, made pretty by an unknown copyist in order to effect a sale to some credulous client.

This art of oil painting restoration began in the 18th Century. At first the work was entrusted to inferior artists. The effect of this was unwarranted over-painting, in many instances portraits being touched-up so much that all semblance to the original was lost for centuries.

"Grand Canal, Venice" by Turner. An example of a cleaned oil painting done with beeswax paste.

The "dandified" picture, done by an unknown painter.

Forgers appeared on the scene and flourished. Hundreds of paintings of this period have been falsely attributed to the old masters. No doubt many other valuable works are covered yet by the paintings of less worthy artists.

Thus the need for the developing art of picture restoration is evident. Unlike wax paintings, now little used as a medium of expression because of almost insuperable difficulties of technique, and the opacity of the finished work, oil paintings are subject to quick decay and discoloration. Mold growth, bloom or smokiness, heat and cold, contraction and expansion, blistering, and humidity all make highly precarious the life and good health of an oil painting.

Then too, many painters did not study their materials well enough. They used inferior paints, fading, changeable colors, and knew too little of the vagaries of chemical action caused by the many diverse materials. Museums to which their work was entrusted, often added physical damages and cheap gloss varnish coatings to the pictures.

So, recently, there has sprung to the fore this latest of the fine arts, oil painting restoration. The value of beeswax to this art is best indicated by the fact that one of the foremost American art bulletins gives three times the space to beeswax, as is allotted to all the other waxes combined. Its versatility is demonstrated by its varied uses.

In Pourbus' Portrait of a Lady, for example, it was necessary to remove an overcoating of paint without damaging the original. It was carefully washed with a beeswax paste solvent, and soaps that often contain the honeybee wax. The process frequently takes several years of steady work in the hands of expert artists. A similar method is followed when a priceless painting beneath a painting is discovered by means of the X-ray. By using wax-resin adhesives after the first stage of the work it sometimes is found possible to remove a sizeable part of the top painting in one operation. The cost of undoing previous retoucher's work is frequently in excess of 10,000 dollars. The specialists for the work in this country are in the Fogg Museum in Boston.

On the other hand, original paintings are found at times in such poor condition they are scarcely recognizable as works of art. Wooden supporting frames have been eaten away, or the canvas is so rotted it crumbles at touch. Colors have faded into black; smokiness has clouded

X-ray photo showing the original painting and wooden supports behind the canvas.

faces and paint has peeled off or cracked up. One executed by the universally admired Italian, Raphael, was the subject of complete transference of the paint film as early as 1751.

In this operation the fragile film of paint only a few thousandths of an inch in thickness is lifted bodily from the old canvas and frame, and placed without damage on new material. The delicate process is not unlike the child's game called transfers, a type of decalcomania. Beeswax is used throughout.

The wood frame is first detached; beeswax solvent pastes then loosen the attchment of the paint for the canvas. A beeswax-resin adhesive follows, being applied to the entire surface of the painting by means of heat. It is then gently lifted in one piece for deposition on its new canvas and frame.

Probably the two best known paintings of all times are Raphael's Sistine Madonna in Rome, and Paolo's Descent from the Cross. Both have been retouched and thoroughly cleaned with beeswax and preserved for the future with the same material.

Nowadays the new frame and canvas are treated for permanence. In order to overcome damage from many possible sources, wax again comes into play. The wooden frame is saturated in a beeswax soluton. The paint film is attached to the canvas and that to the frame, by a 60 per cent beeswax—40 per cent resin adhesive.

Summed up by the Fogg authorities, beeswax is used for these reasons.

1. Perfect protection from sunlight, gases, soot and dust.
2. Elasticity to temperature changes, thus preventing cracks.
3. Best known moisture protection, preventing blisters.
4. Not too brilliant, yet transparent and colorless.
5. Absence of chemical reaction on the paint colors.
6. Easily removed for future retouching.
7. If applied with the aid of heat it cannot be removed easily. This is done in the case of well preserved old masters requiring no futher work, for prevention of any unwarranted retouching in the future.

Another point worth noting is that beeswax has been selected as the best material on a basis of scientific comparison with many materials of modern development. Among these are nitro cellulose, and cellulose acetate, products of industrial chemistry, and older substances like gums,

(Please turn to page 357)

Third stage. Pourbus' "Portrait of a Lady" worth a small fortune.

Granulation and Its Prevention*

By V. G. Milum,

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THE color and individual flavor of honey from a particular kind of plant is due to the chemical nature and the variation in the amounts of the various constituents of the original nectar. The greatest variations of these constituents or parts apparently are related to differences in types of soil on which the same species of honey plants are growing and the rapidity of the honeyflow or volume of nectar secretion. In general a particular type of honey from a given kind of honey plant is lighter in color as the honeyflow or nectar secretion is more abundant and darker in color with a less abundant nectar secretion. Likewise, as the flavor of honey is affected, the darker a honey of a given plant source the stronger is its flavor and vice versa. This darker color and stronger flavor is probably due to a greater proportion of the elements which produce color and flavor in relation to the total amounts of the sugars in the nectar secreted.

As the flavor of honey is closely associated or related to color in the original nectar as gathered by the bees and evaporated into honey, likewise are the two physical characteristics closely bound during handling, processing and storage by the beekeeper. Many factors which affect color also affect flavor especially in heating to prevent granulaton. Since granulation is sometimes followed by fermentation, the problem of the proper care is somewhat complicated.

Generally speaking the greatest amount of damage to the natural color of honey or discoloration with a corresponding loss of its delicate and particular flavor is due to the practice of holding all or a part of the honey at too high a processing temperature for too long a period or the subsequent storage at a high temperature over a long period. Other factors involved are contamination, the types of processing receptacles and the nature of the storage containers, especially the lids or closures for same. These factors affecting color and flavor of honey will be discussed in a succeeding article but since some of these factors arise as a result of the attempts to prevent granulation and possible later fermentation, the subject of granulation and fermentation must first be considered.

The tendency of honeys to granulate is primarily dependent upon the concentration of its sugar in relation to the water content and the relative proportion of the dextrose and levulose. In general, honeys relatively high in dextrose as compared to the levulose which is usually higher, other conditions being equal, will granulate more quickly and vice versa, although Fulmer and associates (4) state that there are some marked exceptions to this rule.

For instance, dandelion honey with percentage of dextrose—39.98 and levulose—37.59, according to Lynn, Milum and Englis (6), granulates very readily while tupelo honey does not granulate, its reducing sugars according to Browne (1) being in the proportion of 24.73 dextrose to 48.61 of levulose. However, the proportions need not be as pronounced as in these two types of honey as is shown by the ready granulation of sweet clover honey which according to Browne (1) has 36.78 per cent of dextrose and 39.59 per cent of levulose. The average composition of seven samples of 1933 and 1934 sweet clover (Illinois) as reported by Lynn, Milum and Englis (6) was 36.60 per cent of dextrose and 40.05 per cent of levulose. It is, therefore, evident that it is the dextrose that results in granulation due to its inability to stay in solution at a given concentration in a particular mass or container of honey at a favorable granulating temperature. An illustration of the effect of the relative amounts of levulose and dextrose upon granulation is shown in Table 1 giving the chemical analysis of four honeys and the amounts of granulation after one year storage at variable temperatures shown in Tables 2, 3, 4 and 5. It is evident that the fall honeys showed the least tendency to granulate even at favorable granulating temperatures.

According to Dyce (2) the range of temperature favorable for granulation is between 50°F. and 65°F., with 55°F. being suggested as an optimum temperature for average honeys. Our own experiments (6) shown in Tables 2, 3, 4 and 5 gave the greatest amount of granulation at 50°F., when only the points of storage as listed on the chart were used. Dyce states that crystal formation is roughly in proportion to the amount and number of nuclei which "may be dextrose hydrate crystals, already existing or introduced, colloidal particles normal to all honey, solid particles (as pollen grain), or minute air bubbles."** Probably the dextrose crystals are the all-important nuclei, it being said that these crystals actually float about in the air. But there are other important sources of these dextrose crystals in extracted honey production such as granules in the extracting combs of the previous season and in the cracks and crevices of extractors and storage tanks if they have not been thoroughly cleaned.

Since these introduced dextrose crystals may be sources of future trouble in processing and storage, it is highly important that every attempt be made to prevent their being added to the new extracted honey. First of all the producer of extracted honey should use combs that are built from new foundation or extracting combs from which the bees have had opportunity to remove all the remaining honey of the old crop previous to the storage of the new crop of honey. Contrary to the practice of some beekeepers of saving the wet extracting combs as a stimulus to brood rearing when added in the spring, far better the results would be so far as granulation is concerned if these wet combs were cleaned of all honey by the bees at the close of the previous season. Care should be taken to prevent mixing the extracting frames with frames from the food chamber supers where such are used. Such practices help to eliminate many

*Contributions from the Entomological Laboratories of the University of Illinois, No. 203.

**Dyce, E. G., 1931. Fermentation and crystallization of honey. Cornell Agri. Exp. Sta. Bul. 528:3-76.

dextrose crystals which serve as nuclei for initiation of granulation in the new crop. Likewise all utensils and containers used for storage should be thoroughly cleaned before the new crop is placed in them. Special attention must be given to the cracks and seams where granules may collect and remain unless especially persistent efforts are used to remove them.

Because granulated honey sometimes ferments when it is kept at a favorable temperature, it is evident that beekeepers, jobbers, honey-bottlers or others who handle honey have a variety of problems. First of all, most honeys show a tendency to granulate unless stored at high temperatures where the deteriorating effects of discoloration and loss of flavor result. At first thought the lesser of the two evils would seem to be storage at low temperatures where unheated or insufficiently heated honeys may granulate. The greater portion of the range of good granulating temperatures, 50-65°F., is much within the range of temperatures favorable for fermentation, 51.8-65°F., according to Wilson and Marvin (8). Therefore, an unheated honey that is allowed to granulate may ferment unless stored below 52°F. At such a temperature properly processed or heated as well as unheated honey will keep perfectly except for granulation of the latter. But when the unheated and granulated honey is moved to a higher temperature such as happens when moved from the honey house of the beekeeper to that of the jobber or bottler where the temperature range is higher, trouble may follow. Many cases have been reported wherein such honey soon showed evidence of fermentation where the higher temperatures permitted the growth of the yeast organisms in the liquid portion of the container of honey. The resultant losses could have been prevented by a sufficient pasteurization to kill the yeasts or heating at sufficiently high temperatures to prevent granulation while the honey is in storage before consumption. For other reasons that will be pointed out later, honey after extracting ordinarily should not be held in storage for long periods before it is processed.

In any consideration or discussion of the heating or processing of honey to prevent granulation and fermentation it must be remembered that there is a difference between pasteurization to kill the yeasts and heating to melt the dextrose crystals to retard or eliminate granulation. A graph by Dr. E. E. North in the U. S. Public Health Service Bulletin 147 for 1925 indicates that such human disease bacteria as tuberculosis, typhoid, streptococci and diptheria are killed when milk is heated to slightly less than 140°F. for not more than 25 minutes, a part of these at much lower temperatures. Laws regulating the pasteurization of milk are partly based upon such information with the limits increased to provide an additional margin of safety. The state law in Illinois requires a pasteurization temperature for milk of 143.5°F. for 30 minutes. Some eastern states allow a temperature of 165°F. for 15 seconds.

Fabian and Quinet (3) in 1928, reported the finding of twenty-five different yeasts in twenty samples of honey. With honey seeded with a suspension of yeast spores from all the different cultures and then heated to 62.5°C. (144.5°F.) and held for 30 minutes, no yeast growth was evident at the end of three weeks. Thus so far as "pasteurization" is concerned if we refer to the killing of yeasts and human disease bacteria a temperature of 145°F. for 30 minutes is sufficient provided that assures that all portions of the honey will reach a temperature of 145°F. for the half hour period.

But our own tests (7), as well as those of others indicate that a satisfactory "pasteurizing" temperature (145°F. for 30 minutes) is not sufficient to prevent granulation of all honeys for a period of one year or even less if the honey is stored at temperatures conducive or favorable to granulation. This is especially true of honeys that are well seeded with dextrose granules. These experiments seem to indicate that it is extremely hard to melt some of the granules if we judge from the amount of granulation at the end of a year as indicated in Tables 2, 3, 4, and 5. It is entirely possible that some granulating honeys if stored in new or granule free combs and processed immediately after extraction might be prevented from granulating by a temperature of 145°F. for 30 minutes, but such is not satisfactory for many honeys.

Fulmer and associates (4) have suggested a method of controlling honey granulation by adjusting the water content at 20% and then heating at 122°F. for three hours. These authors (5) also have suggested a method of analyzing the water content of honey by the use of the refractometer. However, due to the technique and equipment involved, together with the probable psychological effect upon the buyer, it is not likely that this method will be widely used since somewhat more simple treatment will accomplish the same purpose of preventing granulation and fermentation.

Table 1—Chemical Composition of Honey Samples in Tables 2, 3, 4, 5.

No.	Polarization	Water	Invert sugar	Levulose	Dextrose	Sucrose	Dextrin	Ash	Acidity	Undetermined
D (7)—Table 2	-17.0	15.90	77.88	40.15	37.53	3.01	0.33	.07	.15	2.66
(8)—(Comb)	-17.2	15.80	77.90	40.23	37.67	3.03	0.34	.07	.15	2.71
C (9)—Table 3	-18.2	16.16	76.98	39.15	37.83	1.96	0.04	.05	.17	4.64
B (13)—Table 4	-14.6	16.63	75.40	40.67	34.73	2.26	0.42	.09	.11	5.09
(14)—(Comb)	-14.7	16.60	75.59	41.20	34.39	2.11	0.53	.09	.10	4.98
A (15)—Table 5	-15.1	17.60	73.58	43.43	30.15	1.13	0.88	.08	.01	6.72

This table is condensed and revised from tables by Lynn, Milum and Englis (6) and Milum, Lynn and Crum (7) appearing in the 1933-1934 Illinois State Beekeepers' Association Report.

Samples D, C, B, A are samples simliar to those used in the experiment, the results of which are given in tabular form in Tables 2, 3, 4, 5.

Samples D (7) predominately sweet clover, was extracted from completely sealed combs of the honey flow from June 9 to July 1, 1933, and removed from the bees before August 1, without contamination with honey of the fall flow. Sample (8) was comb honey of the same period as D (7).

Sample C (9) was similar to D (7) except extracted from combs not completely capped, thus being honey gathered during the latter part of the summer flow.

Sample B (13), predominately heartsease, extracted from completely sealed combs filled from August 26 to September 13, 1933, removed from the bees October 12, thus possibly containing some honey from late fall flowers. Sample (14) was comb honey gathered during the same period.

Sample A (15) was similar to B (13), except extracted from combs not completely capped, thus in part being honey gathered during the latter part of the fall flow.

See Tables 2, 3, 4, 5 for amounts of granulation of these honeys when subjected to variable processing temperatures, differences in strainers and variations in storage temperature during a one year period.

Explanation of Tables 2, 3, 4, 5—Each table gives the percentage of crystallization of one of the four kinds of honey listed in Table 1 after one year of storage at the variable constant temperatures of the left hand column. Separate portions of each honey were heated to 130°F., 145°F., 160°F., and 180°F. and held for 30 minutes before being strained with three different types of strainers

Table 2—Percentage of Crystalization of Honey Sample D (7) (1933 Sweetclover from fully capped combs), after one year of storage at constant temperatures.

	130°F.			145°F.			160°F.			180°F.		
	F	S	M	F	S	M	F	S	M	F	S	M
98°F.	---	---	---	---	---	---	---	---	---	---	---	---
Room	13	6	0.5	4	0.2	T	T4	---	---	---	---	---
(Room)	11	2	0.5	1	0.2	T	---	---	---	---	---	---
77°F.	7	2	0.6	0.5	T	T3	---	---	---	---	---	---
59°F.	35	10	20	4	2	0.8	---	---	---	T1		
50°F.	50	30	25	4	5	2	T4	---	---	T2	---	---
40°F.	60	15	4	10	7	0.5	---	---	---	---	---	---
(32°F.)	80	2	T	0.5	T	T1	---	---	---	---	---	---
(0°F.)	20	0.3	T	T	T3	---	---	---	---	---	---	---
—10°F.	---	---	---	---	---	---	---	---	---	---	---	---

Table 3—Percentage of Crystallization of Honey Sample C (9) 1933 Sweet clover summer flowers), after one year of storage at constant temperatures

	130°F.			145°F.			160°F.			180°F.		
	F	S	M	F	S	M	F	S	M	F	S	M
98°F.	---	---	---	---	---	---	---	---	---	---	---	---
Room	18	10	3	1	0.3	T	T3	T4	---	---	---	---
(Room)	15	9	1	1	0.2	T	---	---	---	---	---	---
77°F.	10	3	1	0.5	T1	T3	---	---	---	---	---	---
59°F.	45	30	15	5	2	3	---	---	---	---	---	---
50°F.	65	40	50	30	10	2	T1	T3	---	T2	T4	---
40°F.	60	30	45	6	5	1	T	---	---	---	---	---
(32°F.)	45	15	20	1	T	T2	---	---	---	T2	---	---
(0°.F)	20	8	0.3	T	T2	---	---	---	---	T4	---	---
—10°F.	---	---	---	---	---	---	---	---	---	---	---	---

Table 4—Percentage of Crystallization of Honey Sample B (13) (1933 Heartsease from fully capped combs), after one year of storage at constant temperatures.

	130°F.			145°F.			160°F.			180°F.		
	F	S	M	F	S	M	F	S	M	F	S	M
98°F.	---	---	---	---	---	---	---	---	---	---	---	---
Room	T2	T2	T3	T2	T2	T3	---	---	---	---	---	---
(Room)	T	T	T	T2	T3	T3	---	---	---	---	---	---
77°F.	T3	T3	T4	T4	T4	T4	---	---	---	---	---	---
59°F.	2.5	2	1.5	0.5	0.5	T	---	---	---	---	---	---
50°F.	15	10	20	5	4	1	T1	T	T	---	---	---
40°F.	0.5	2	1	0.5	1	0.5	0.3	---	T	---	---	---
(32°F.)	T	T1	T	T2	T3	T2	---	---	---	---	T5	---
(0°F.)	T3	T3	T3	T3	T4	T4	---	---	---	---	---	---
—10°F.	---	---	---	---	---	---	---	---	---	---	---	---

Table 5—Percentage of Crystallization of Honey Sample A (15) (1933 Heartsease plus late fall flowers), after one year of storage at constant temperatures

	130°F.			145°F.			160°F.			180°F.		
	F	S	M	F	S	M	F	S	M	F	S	M
98°F.	---	---	---	---	---	---	---	---	---	---	---	---
Room	---	---	---	---	---	---	---	---	---	---	---	---
(Room)	---	---	---	---	---	---	---	---	---	---	---	---
77°F.	---	---	---	---	---	---	---	---	---	---	---	---
59°F.	0.2	1.0	T	T	T	T2	---	---	---	---	---	---
50°F.	1	2	0.5	1	0.5	0.3	---	---	---	---	---	---
40°F.	2	5	3	1	0.3	0.7	---	---	---	---	---	---
(32°F.)	T1	T1	30	?	T3	T1	---	T	---	---	---	---
(0°F)	T2	T1	T	T4	---	---	---	---	---	---	---	---
—10°F.	---	---	---	---	---	---	---	---	---	---	---	---

as follows: F-Silk bolting cloth of 86 mesh per inch; S-sugar sack toweling of 48 mesh to the inch; and M-outing flannel of milk strainer cloth of 46 mesh to the inch.

Amount of crystallization is given in per cent except very slight amounts recorded as a trace (T) with the use of T1, T2, T3, T4 and T5 representing increasingly smaller amounts. All samples recorded as having a trace (T) were not sufficiently granulated to be objectionable to the retail trade.

(Note—these tables are revised from a report by Milum, Lynn, and Crum (7).

The most common recommendation for heating honey or processing to prevent granulation is to heat the honey in a water bath with some means of stirring or agitation until it reaches a temperature of 160°F. and hold at that point for 30 minutes. Some claim that this temperature is too high and that there is some discoloration and loss of flavor but if carefully done in a closed container and surrounded by a water bath with agitation or mixing especially of the hotter portion of the honey next to the water bath, our experiments show very negligible deteriorating effects. At temperatures as high as 175-180°F. for 30 minutes there may be considerable loss of flavor and some slight discoloration.

Dyce (2) who made an extensive study of honey granulation states that he found no deterioration in samples heated to 130°F. for thirty minutes, but the quality was injured when honeys were heated to 160°F. and left to cool slowly. He also stated that "honeys heated to 200°F. and rapidly cooled to room temperatures were uninjured." As previously suggested even if raised to this point quickly and then rapidly cooled all crystals in a heavily seeded honey may not be melted. It seems that the amount of heating necessary to prevent granulation varies with different honeys, the water content, the amount of seeding with dextrose crystals, temperature of storage and other factors all of which must be considered in determining a processing temperature.

At this point it might be in order to say something about the so-called "flash" systems of heating where the honey is exposed to even higher temperature than 160°F. for a short period of time. While such systems may cause little damage to the honey and usually prevent granulation for a period of time, apparently they are not so effective with honeys that are already heavily seeded with dextrose crystals. Our conclusions are based on our own observations and reports of granulation of honey processed in some of the more modern filtering systems. For a "flash" method to work successfully it is best that the honey be extracted soon after removal from the bees and then processed before the honey becomes heavily seeded with dextrose crystals.

Other than the type of honey, the amount of seeding of a particular honey, the temperature of processing and the storage temperature, there are a few remaining factors which affect honey granulation. Among these are of the type of strainer used if the honey has not been heated sufficiently to melt all crystals formed. In an experiment (7) we found that with honeys heated only to 130 and 145°F. for 30 minutes and which granulated in various amounts during the first year (See Tables 2-5) the amount of granulation in general was proportional to the size of the filter pore in the strainer. Using silk bolting cloth of the size corresponding to the requirements for U. S. Fancy Grade of extracted honey (86 mesh to the inch), sugar sack toweling of 48 mesh to the inch and milk strainer cloth of 46 to the inch, it was found that the amount of granulation was greatest in the reverse of the order named. In other words, the milk strainer although it permitted only a slow passage of the honey was more efficient in straining out the unmelted dextrose crystals because of its nap which formed a finer network of strands of cotton, while the silk bolting cloth with 86 mesh to the inch consisting of single individual threads of silk with no nap allowed the passage of the crystals because of the comparatively larger filter pores. The efficiency of the ordinary sugar sack toweling was between these two extremes and since, so far as cleanliness is concerned, meets the requirement for U. S. Fancy Grade of extracted honey is therefore recommended. Such cloth, one square yard in size, may be purchased at most department stores at ten cents each or less in lots of ten. However, some states require that extracted honey, in order to meet certain requirements, be as clean as if strained through cloth of the milk strainer or outing-flannel type as in

the state or Oregon where Grade A requirements are that the honey be as clean as if strained through standard bolting cloth of 86 mesh per inch at a temperature of not more than 130°F., or "Daisy Cloth," or a 40 to 50 mesh per inch outing flannel at a temperature of not more than 150°F.

Once honey has been processed or heated and strained it should be bottled while hot and sealed to prevent contamination with any dextrose crystals as well as yeasts which are known to actually float in the air. If they fall into the hot honey, these small crystals will be instantly melted and the yeasts killed but if the honey is cooled before placing in the containers reseeding of the honey with yeasts and granulation nuclei may result. Likewise, opening of containers after the honey is cooled should be avoided for the same reason. All lids of containers should be air tight.

Agitation of honey after it is placed in containers has some effect upon the amount and rate of granulation since a greater dispersion or scattering of any unmelted dextrose crystals is thus accomplished. This is not a serious factor affecting granulation in honeys which are handled and processed in the ordinary manner to prevent granulation but it is an important factor in actually increasing the spread of granulation when creamed or crystallized honey is actually desired as in the Dyce process (2) developed at the Cornell Agricultural Experiment Station. Briefly this process suggests the actual incorporation of slightly more than 5 per cent of a finely granulated honey, with agitation of the mixture for about fifteen minutes with care to prevent incorporating air bubbles that may cause a scum on the top surface and also contain yeasts that may later cause fermentation. After the seeded and mixed honey is placed in the storage containers, Dyce recommends that the honey be stored at temperatures near 57°F. to induce rapid granulation.

Although the bottler of honey has properly prepared his honey by heating to prevent future granulation and possible later fermentation and placed it in clean containers properly sealed, any honey is still subject to possible deteriorating effects. First of all, the honey once placed in containers and sealed should be cooled as rapidly as possible because of the discoloration resulting from long prolonged heating. Above all, the containers without precooling should not be placed in cardboard cartons or, if in sixty-pound cans should not be stacked up in large tiers. According to personal conversation with Dr. Fred W. Tanner, Bacteriologist of the University of Illinois, "stackheat" has been shown to exist in stacks of canned foods for as long as thirty days. Similarly honey when not precooled after packaging and before being stored is subjected to the long period of high temperatures which tends to add to its discoloration and loss of some of its delicate flavor. Likewise, the temperature of storage and other factors are important considerations which must be taken into account by the beekeeper and other handlers of honey.

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—ABJ—

Is the Queen Bee a Queen in Fact?

By W. H. Hull,

North Carolina.

Modern beekeepers generally consider the queen bee as an egg-laying machine, pampered and cherished by the workers but without influence or power in the hive. This is in direct contrast to the earlier belief, as expressed by Samuel Purchas some 300 years ago. He says:

"The Queen bee (for it is an Amazonian Commonwealth) transcends in greatness and beauty of body, but which is most praiseworthy in a Commander, in mildness and gentleness . . . The laws whereby the commonwealth is ordered are natural not written in letters but engraven in their manners, and so studious are they of peace that neither willingly nor unwillingly do they offer injury to any of their subjects . . . . How the Queen governs I cannot certainly determine. Each bee readily fulfills and follows her proper task, and all in all, aim at the public welfare, none, how old so ever, desiring a Writ of Ease, but all labor until their labors kill them."

Before rejecting this theory we should consider the marked variation in performance of colonies of equal strength under identical conditions, a phenomenon that has never been explained except in vague generalities; and the further fact, noted by many practical beekeepers, that when a gentle queen is introduced into an ugly colony of bees the bees become gentler long before any of that queen's progeny have emerged.

The theory of the queen as an egg-laying nonentity is based on the assumption that the lower animals do not share man's conception of authority, and government; and that the reason they do not share it is because they are lower animals. I think that is driving at the proposition with the tails of our horses for'ardmost. It seems much more likely that the origin of our conceptions of authority, as well as of many other things that we do, lies far back in the line of our evolution.

Take, for example, the ants that march and fight in military formation. Certainly the ants did not learn that trick from us. Nor is there anything to indicate that we copied it deliberately from the ants. More plausible, it seems, is the theory that we have carried it over from the time we were ants ourselves, or something of that nature.

Coming a little nearer home, every farm boy knows that every herd of cattle or horses, every pack of dogs, has a leader that governs in a very definite manner, and maintains discipline, more or less strict, according to the nature of the individual leader.

From these facts I submit the following: (1) That the queen bee does govern in a very real sense. (2) That the discipline maintained varies with the individual traits of the ruling queen. (3) That the influence of the queen is a deciding factor in "the spirit of the hive," and that the queen's individual traits, entirely apart from her egg-laying ability or from traits transmitted to her progeny, is a very real factor in the performance of the colony.

Bees Started Sabastian Kresge to Five-and-Ten-Cent Fame

By Ruth Hodgson,

Wisconsin.

Sebastian Kresge in Florida. Money from bees gave him his first capital. (Photo by Roy Wolf, manager of the Halsted Avenue store in Chicago.)

SABASTIAN S. KRESGE'S name conjures up the vision of spacious stores with "Kresge" in gold letters above the doors. When we hear his name we seldom think of the man but of his success. Now I intend to acquaint you with the man.

When he was fourteen he became interested in bees. To quote from his letters: "At that age I bought a swarm from a neighbor, of the ordinary dark or leather colored bee, put them in an ordinary box hive with a space in the upper part for boxes for surplus honey. This was not very successful."

Now that he was interested he began to study beekeeping. He bought a modern hive and transferred his bees into that. He loved them, and his interest in them increased. To quote him: "There was nothing on my father's 113 acre farm that I liked to work with so well or which inspired me so much." He thinks perhaps one of the reasons he worked with them so diligently was because he was allowed to have the proceeds from the bees and not from anything else on the farm.

When he was 19 Mr. Kresge taught country school at $22.00 a month for a five month term. The school was located about two miles from his father's farm. The next winter he worked in a grocery, vegetable, fish and meat market in Scranton, Pa. The money he earned these winters until 21 years of age he turned over to his parents. The bees cost them nothing except his spare time and they were glad to see him have the returns from them. He was continually studying whatever books and magazines he could get on beekeeping. He says of bees: "I always felt they helped me appreciate nature, and gave me the idea of thrift, industry, and economy."

He had increased his apiary to 32 colonies by the time he was 21, while living on his father's farm in Monroe county, Pennsylvania. "The last year on the farm," writes Mr. Kresge, "those bees made $150.00 worth of honey, the proceeds of which put me through Eastman's National Business College, at Poughkeepsie, N. Y., where I graduated in March 1889." His bees were a stepping stone to better things.

When he graduated from college he got a bookkeeping job in Howley Bros. general hardware store in Scranton. He stayed with them two years. Then he was a salesman for Berets Son Co., out of Wilkes Barre, Pa., for five years—saving every penny he could to start himself in a business. By the time he had saved the sum he had set as necessary he had decided what business he wanted to go into and in March 1897 he started his first 5 & 10c store. Now he has 745 stores in the United States and Canada.

He established his 5 & 10 headquarters in Detroit, Michigan, and because of the stress of business in developing his stores he did not have time to keep bees. He handed his apiary over to his father when he left the farm.

His love for the bees was deeply rooted, however, and he says: "I actually dreamed frequently of bees, and my experience and love for them still lingered with me to such an extent that I got a single colony which I placed on the lot of my residence in Detroit." His "lot" consisted of about four acres right in the center of Detroit. There were many vacant lots in that city twenty years ago, and sweet clover and other plants furnished honey from spring until late fall. He increased his Detroit "apiary" to four colonies. One year his four colonies averaged 225 pounds of honey per colony. He felt this was quite an achievement because on

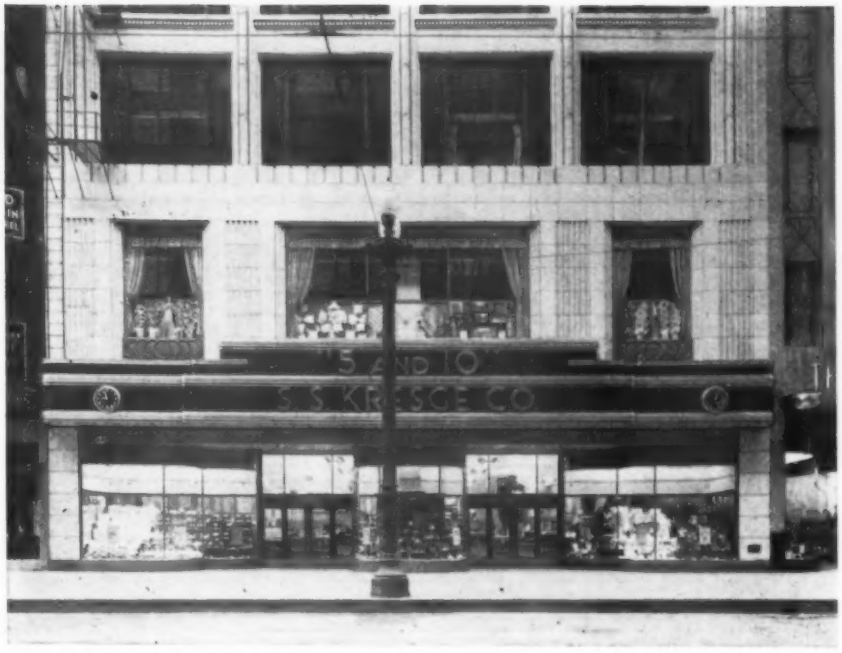
In Springfield, Massachusetts, customers enter this corner store, a location to delight any store manager.

the farm he had never got more than 118 pounds from one colony.

Later he became so busy that he did not have any time for bees and with regrets he packed them up and shipped them to his nephews in Weatherly, Pa. He had to do much traveling, in starting new stores and there was no one at home who could care for the bees.

Mr. Kresge has a country home in the Pocono Mountains, in Monroe County, Pennsylvania, only 28 miles from his boyhood home. His mother at 99 years still lives on the homestead. About four years ago he decided he again wanted bees to play with but found that they haven't much pasturage after the middle of July, because of the mountainous country around his place; not like mother's farm, in a valley rich in clover and buckwheat.

"I think the experience with bees is a splendid thing for a young person from an investment standpoint, and a great teacher of thrift, industry, economy, and nature, and brings out the finer qualities in a person," he remarks, adding that a nephew on the homestead farm is "very much in the bee business" with about 70 colonies, securing from 4 to 6 tons of honey a year. He always exhibits at the state fair and always receives premiums. "All of this," says Mr. Kresge, "because of the bees I left behind after leaving the farm."



Now 745 stores from coast to coast show the power of Kresge's determination to put his merchandizing idea to work. This is a Kresge store in Chicago.

Mr. Kresge has built up a retail business of about two hundred million dollars a year besides other interests and bees had a lot to do with his success. He learned much from them. They proved to be a stepping stone to bigger things in his youth and an ideal hobby to lighten a busy later life.

—IBJ—

Drought in Australia

By R. G. Maclachlan,

Australia.

AUSTRALIA is a continent liable to droughts, and rural life over nine-tenths of it must accommodate itself to the possibilty of them. They do not come quite at random: a certain order has been noticed, a certain periodicity. When I was young I heard the drought of 1867-68 often spoken of, and later lived through the 1902-03 drought. Then came 1914-15, and now 1937-39. If one looks at these dates carefully, one notices a certain regularity in their spacing. There are the 35-year periods and the 11-12 year periods. The 35 year periods are most pronounced, the shorter periods more often culminating in long dry spells, hardly to be called drought.

The present drought is remarkable from the beekeeping standpoint, as being more widespread than any former one. 1902 hardly touched the main beekeeping areas; 1914 hit some of them hard, but left others untouched. But this time there has been no escape for huge areas. Three-fourths of Australian beekeeping is carried on in the southeast corner of Australia, comprising all the state of Victoria, and parts of the neighboring states of New South Wales and South Australia. All these have come this time under the dominion of drought.

Perhaps the most spectacular happening of the drought was the destruction of scores of thousands of colonies during January of this year by hot winds. In the state of Victoria, January was a terrible month by reason of forest fires, which destroyed a thousand homes and seventy human lives. But though Australian beekeeping is mainly a forest industry, the loss of apiaries by fire was not very great. One apiarist was burned along with his bees, and in other places great expanses of beekeeping forest were overrun and apiaries burnt; but the worst fires were not in beekeeping country. The heat and the winds, however, that made the fires so terrible were deadly to many apiaries.

Most of this loss came on one day, January 13, when shade temperatures ranged from 110 to 120 degrees, Fahrenheit, over most of the country, while sun temperatures probably reached 170 degrees in places. In the city of Melbourne, with shade heat at 114, sun heat was

at 156; And Melbourne is on the south coast, furthest removed from the great central deserts that heated up the winds. In South Australia, where the heat losses were greatest, apiaries were hundreds of miles farther north, and nearer the deserts. There most apiaries are reported destroyed. Thus one lost 600 colonies out of 680, and others in similar ratio. Seven eighths of all South Australia hives are reckoned dead.

It was the wind, driving at seventy miles an hour, that made all attempts to save apiaries useless. Some piled green boughs on their hives, or sprayed hives and bees with water; but the wind was so hot the bees dropped dead on the bottom boards, when they were not smothered by honey laden combs melting down.

In Victoria the heat did not generally reach this destructive height. At my own apiary the shade heat reached 112, and the sun heat probably 150 degrees, with the wind blowing a strong gale. I noticed before noon that not a bee was showing anywhere, and on lifting covers I saw the bees all clustered as compactly as if it were a winter morning. The clusters were all small, for times had been bad a long time; I took buckets of water and sprinkled each cluster with a pint of water, just lifted the covers and sprinkled them all, without a bee flying at me. They seemed all cowed by the heat and wind. That pint seemed enough for them, (though big clusters would have needed a quart) for in the evening, when the wind dropped, there were very few water carriers.

The loss of combs from this heat was very great, but loss by wax moth ravages was also unusually large. Most apiaries this season had little need of supers, while there was a lot of shifting to keep bees alive. Supers of combs left stacked at home soon became infested. Australian apiaries are mostly not heavily supered, as honeys are normally dense, and can be soon extracted. For migratory beekeeping 150 supers per 100 colonies is reckoned ample. Stationary apiaries might use a few more. But between colonies dying out and supers stacked, the expense of combs for wax moth breeding was many times the ordinary.

I hit on a way of stacking supers to defeat the wax moth, that may be old, though I have not seen it mentioned anywhere. It is quite simple. Instead of tiering up the boxes, as when on hives, stack them on end, each with a full complement of selfspaced frames, so that the light can shine through, and the cool night air blow through. So stacked in the open I have found, after four month's trial, that hardly a comb had been attacked. Not one in a hundred, while combs in boxes tiered up, with covers on, were badly infested after four weeks.

Darkness, of course, has long been known to be the wax moth's best friend, and light their worst enemy. The fact seems to be that wax moth grubs **cannot** live in daylight. I noticed in combs that had been somewhat eaten in supers stacked on end, that the moths had nearly all disappeared. The grubs had probably been in the combs before they were so stacked, but the light of day was too much for them. The absence of grubs was not due to lack of moths, for I often saw **them** about. I think this dependence of wax moth grubs on darkness for development worth scientific attention, just to see what intensity of light is fatal to them.

I have spoken of Australian honey as normally dense, and in such a dry year, with half the ordinary rainfall, it might be thought that what honey there was would be of good body. Actually, though the honey harvest is reckoned by some to be about one tenth of what it sometimes is, all the newly gathered honey has been very thin; what I have seen of it had hardly the consistency of honey at all. This has surprised many, and yet the explanation is probably simple enough.

One cannot give any one cause for nectar, or newly gathered honey, being thinner than usual. It is most likely to happen when either soil or air are over moist, but moist soil will cause it with dry air, and moist air with rather dry soil. Too much water may be secreted along with the nectar, or the nectar may absorb moisture from the air. But here with very dry air, and a high temperature, and a soil so dry that only deep rooted trees can keep alive, the nectar is so thin that bees would probably not gather it if anything better offered.

The cause most likely is that if water is scarce, sap sugar is scarcer. We look upon eucalypt honeyflows as depending primarily on the sugars stored between blooms. Blooms of the same species come occasionally every year, but are oftener two, three, or even half a dozen years apart. Generally, for any species, the longer apart the blooms the heavier the flows; but the rainfall between bloom times is also very important. With normal rains there is a good banking up of stored sugars, secreted as nectar when bloom comes. But for two years past the rainfall has been about half the average, and sugar storage correspondingly light, so that the best blooms on the best species gave little, and that little mostly water, when gathered. A surplus of water being exuded through the nectaries may make the nectar thin, but the thinness may also come from lack of sugar in proportion to water, however little the water may be. And lack of sugar seems the cause this year.

We may reckon this drought the heaviest blow to apiculture every known here. Losses are already enormous, and apiaries have yet to be wintered. Pollen famine is likely to take heavy toll then. Species usually good pollen yielders give hardly anything at all, and that little of poor food value. It has been noticed all through the season that where brood rearing seemed good, hive population still remained poor. Short-lived bees is the cause. There is likely to be a great trying out of pollen substitutes, especially milk powder, and these well used in late autumn and early spring may tide hive populations over till natural pollen is plentiful again.

Bees are able to breed here at intervals through most winters, and these mild spells give opportunity to keep up the supply of young bees. The job is to bridge the gap from early May till late August. One trouble is that droughts are likely to break in storms and floods, and make conditions as abnormal as drought itself.

—ABJ—

Queen Introduction In Various Seasons

By George H. Williams,
North Carolina.

Bees do not behave alike toward a queen throughout the year even though there is a honeyflow. Last year queens that were reared in my yard were introduced without caging. It was a simple matter to lift the old queen off the comb of brood and set the young one in her place. Several were introduced in this way without a single failure.

This year, things were different. Queens had to be caged, sometimes three or four days before the bees quit balling. On one occasion the old queen was removed and at the same time the young one placed in the hive in a cage. She was not released for two or three days. On opening the hive, she was laying nicely.

Opening the hive again at a later date, she was found dead at the side of the comb with plenty of eggs in the comb. A virgin was running around with the bees. Later more cells were started. I destroyed them and introduced another extra good laying queen in a cage with a piece of excluder over one end. After being released, she was shortly found laying. A week later, there was a queen cell just sealed, the hive filled with eggs and the queen looking good. I destroyed the cell and closed the hive. In another week everything seemed to be normal.

Every year brings something new.

A Boy's Hobby

By Wm. R. Koenig,

Illinois.

WHEN my twin brother and I were about four years old, my father purchased eight acres of woodland, with a creek running through it, about three and a half miles from town, where we erected a cottage and lived during the summer months. Gradually my father bought a few more acres, and, as the family grew, with a sister and a brother, we also remodeled the cottage several times, until it has now grown into a substantial home, with modern conveniences, and it can be used either during the summer or winter.

With the increasing acreage, we also added a pony, some milk goats, chickens, sheep and, later, a family cow. As the livestock increased, the necessity grew for tilling a little of the land, and we bought a team of horses and secured a caretaker.

In company with my dog, I grew up to learn to swim in the creek, ride the pony and trap the ground hogs and possums, the former of which were quite abundant in the woodland.

The caretaker had a small knowledge of bees, and when I was twelve years old my father bought two swarms. The caretaker and I made two hives to house them. Later in the summer, we hived two more swarms that we found hanging in a tree, and I gradually began buying some books and studying the habits and care of these ambitious creatures.

Although I did receive lots of stings, these did not discourage me in the least. There is a saying, "If you stay with the bees, you will win in the end." I made up my mind I would accomplish this feat, and I think I have achieved a great deal already.

In my Sophomore year in high school, I took an observation hive to the biology class, where I kept it for about six weeks, and then kept it in my room at home for the rest of the winter. This afforded me special opportunity for close study of the bees. The next year I hived another swarm or two and bought my first swarm of Italian bees, which I kept at the city home. The Italian bees proved to be easy to handle, and I was determined to improve my apiary in the quality of bees which I kept.

I had now learned to hive them successfully and how to take the honey from the hives. I wintered them in a shed with a southern ex-

Left—Present office and supply room of Bill Koenig's apiary.
Below is shed with southern exposure where he first wintered his hives.

posure which faced toward our orchard. Of course, we had all the honey we wanted at home for our family use, which my mother purchased from me, and I even had a surplus to sell to neighbors and friends. I also began buying a little better equipment and doing a little extracting and bottling, but I became more interested in a fine quality of comb honey.

Last year, when father added some additional acres to our farm by purchasing the one across the road, which had on it some unused buildings, I determined to establish a larger apiary.

We took a small, but well built, hog house, re-roofed it, put in a cement floor, painted it white inside and out, and put in some windows opening to the south. This made a splendid bee house, where I could easily winter 50 hives. I then took a small one-room building which the former owner had used as a cottage and converted it into an office and supply room.

During the past year, I have sold several hundred pounds of comb honey and several pounds of strained honey, which I extracted, bottled and labeled with my own labels. My comb honey was all marketed in cartons, with my name, and only the best combs were sold. Any broken combs were converted into strained honey.

As my knowledge of bees grew, I discovered many things:

(1) The need for strong colonies before the honeyflow.

(2) My errors in introducing package bees in which I did not leave any sugar syrup for them to build out their combs. Therefore, they were not ready when the honeyflow came.

(3) Misjudging the right time to put on supers.

(4) Shortage of comb space for the queen to lay her eggs (two hive bodies).

(5) Allowing them to swarm each year, expecting them to increase and at the same time produce a good honey crop.

May I advise any beginner, as I was, before he ever starts out in beekeeping, to read the life history of the honeybee and know their habits before handling them. I would also visit some well-known apiculturist and find out his ideas on successful bee raising before attempting to buy any package bees.

One more important caution: Do not buy any hives from apiaries which have not been inspected by the state inspector. In fact, I wouldn't buy any until you are somewhat acquainted with American foulbrood. It will save you expense, time and work.

The majority of my bees are Italians, although I have five hives of Carniolans.

I am now finishing my Senior year in high school with about thirty hives, a fine apiary and bee yard, also some fruit trees, which I planted this spring. I expect to sell enough honey this year to pay a good part of my college expenses. I haven't had time for as many social activities as some of my friends, but I have a good hobby, which keeps me in good healthful work each summer, and I have developed a business of my own, even though I am still in school.

—ABJ—

Honey Chocolate Cup Cakes

By Goldamae Carter,

Minnesota.

½ cup butter
¾ cup sugar
½ cup strained honey
2 eggs
2 squares chocolate
1¾ cups flour.
½ tsp. soda
¾ cup sour milk
1 tsp. vanilla

Cream shortening and add sugar. Cream well. Add honey gradually, mixing well. Add beaten eggs and melted chocolate. Sift flour and add soda and salt. Add alternately with sour milk. Drop into muffin tins or paper cups and baked in moderate oven. Cover with honey icing.

Honey Icing

¼ cup butter
½ cup strained honey
½ cup sugar
½ tsp. salt
⅛ tsp. cinnamon
½ cup chopped nuts

Combine butter, honey, sugar, salt, and cinnamon. Cook until it has boiled well. Beat until it begins to thicken. Add nuts, spread on cake. (This icing is excellent if kept relatively cool. It softens readily in warm temperatures.)

Institute News

"Honey, the Sweet that Nature makes Ready to Eat."

The July issue of Bakers' Technical Digest will contain a technical article on the use of honey in the production of bread.

* * *

Under the direction of Miss Jennie Wilmot, Assistant Professor of Home Economics at the University of Texas, honey will be included in the summer session program.

* * *

One of the largest candy bar manufacturers in this country has been using foreign honey in the manufacture of its products but will soon begin to use American honey.

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The Institue is cooperating with some of the largest meat packing companies in this country. These companies are very much interested in not only using honey in their recipes for baking ham but in using honey in the curing of ham.

* * *

The American Honey Institute has been promised one coast-to-coast broadcast next fall besides having been asked to talk from Radio City, New York.

* * *

A re-run of "100 Honey Helpings" and of the leaflet, "Honey in Baked Goods," has just been made. The Institute will be pleased to fill your order for this literature.

Improve the flavor of your fruit salad by using the Institute honey salad dressing recipe.

* * *

The rotogravure section of the New York "Times" on May 18 contained a picture of Dr. James I. Hambleton discussing bees at the Beltsville (Maryland) Federal Demonstration Farm with Mrs. Roosevelt and two cabinet wives, Mrs. Morgenthau and Mrs. Wallace.

* * *

A recent release of Dole Menu "Gems" contains a recipe for Hawaii Winter Cocktail with a honey dressing made of ¼ cup syrup drained from "Gems," ¼ cup lemon juice, and ¼ cup mild honey. This dressing is poured over the fruit which has been arranged in sherbet glasses.

Kellogg's summer release has the following recipe:

Krispie Cream Roll

1½ cups whipping cream
8 marshmallows
¼ cup honey
½ cup chopped dates
¼ cup chopped nut meats
3¼ cups crisp rice cereal

Whip cream until stiff, reserve ¾ cup. Cut marshmallows into small pieces adding them to cream. Add honey, dates, and nut meats. Poll crisp rice cereal into fine crumbs to cream mixture. Blend well. Spread remaining crumbs evenly on piece of waxed paper and place cream mixture on top. Mold into roll, wrap with waxed paper and chill for several hours. Slice and serve garnished with remaining whipped cream and nut meats or fresh fruit. Yield: 10 servings.

ABJ

Where Did They Come From?

Last winter we put some colonies in the cellar under the extracting house, and they all died. They were piled in too closely, without enough ventilation, and the first part of the winter was very mild. The result was that they deserted the hives en masse and clustered at the cellar door, dying in due course when it finally did turn cold. However this is not the real story of this article.

The cellar contained around a hundred hives, still well supplied with honey, but without bees. In spring they were taken out and provided with package bees, all except one. This was a mass of cobwebs where wax moths had eaten the combs.

This is the first time I have seen wax moth in Manitoba. I understand that our cold winters kill the moths. I have lost combs by moth in California and Texas and am familiar with their appearance. In this case the worms appear to have reached maturity, but apparently none pupated. The dead worms were all over the frames.

I suppose that it is correct to assume that these worms got busy after the bees left the hives during the first two very mild months of winter, and that just as they reached maturity the cellar got cold enough to kill them. But where did the eggs come from that hatched out the worms? If our climate normally kills the wax moth and its grubs, how did these get started? And why only one hive in a hundred?

Hy. W. Sanders,
Manitoba.

ABJ

Beeswax Restores Million Dollar Masterpieces

(Continued from page 347)

balsams, mastic copal and dammar varnishes.

In addition, practically all museum paintings, and many family portraits of great value, have been permanently protected. In recent years the use of beeswax for a surface coating, or varnish, has been increasing. According to Maurois, the French oil painting expert, "Beeswax is the only substance ever found adequate to protect oil paintings effectively."

The Fogg Museum calls it the principal oil painter's wax. Several coats of it, in combination with resins, are applied as protection for paintings about to go on exhibition. The wax harmonizes perfectly with the many colored undercoating, producing an aesthetically pleasing effect. It is used also as a varnish for water colors and charcoal drawings. Further tests have proved that beeswax is capable of sustaining a far greater load, or surface stress, than paraffins. The only substances approaching it in value is ceresin.

Some paintings require a glaze coat for finishing. This is done by means of beeswax also, and the application of heat. This method is similar to the ancient encaustic type, or beeswax painting minus the colors. Great brilliancy is achieved.

At the other end of this game, manufacturers of dry colors often include beeswax during the grinding process. Colors so mixed remain fast in sunlight, and are not overly brilliant. Also, in gilding picture frames, there is often burned onto the frame, a mixture of wax and verdigris. The copper of the verdigris is released, combining with the wax to form a gilt covering.

The usage of honey in this field has been more limited. Previous to 1800 it was used in tempera painting mediums, which are composed chiefly of the yolk of egg, glue or less frequently, milk. A more common use was found in keeping old gums and color bases from cracking or becoming brittle. Since that time the main usage has been in retaining moisture in certain types of water colors, and at times in retouching tempera paintings.

Meetings and Events

Lehigh Valley, July 8

The Lehigh Valley Beekeepers Association, comprising Lehigh and Northampton Counties, Pennsylvania, will hold its annual field meeting Saturday, July 8, at 1:00 P. M., Daylight time, at the Apiary of Floyd Sandt, Wagner's Orchard, Easton, Pennsylvania. The program will include talks by E. G. Carr, New Jersey, "Queens and Their Habits"; Harry B. Kirk, Pennsylvania Department of Agriculture, "Distinguishing Characteristics of Bee Diseases"; E. J. Anderson, Extension Apiarist, Pennsylvania State State College, "Meeting Competition by Packaging"; and member talks on production of honey hunks. Entertainment and refreshments are planned. All beekeepers are urged to attend.

Carleton T. Woodring,
President.

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Features of New Jersey Meeting

That disease can be eliminated by the constant diligence of the beekeeper and frequent introduction of new stock featured the talks of two speakers at the meeting of the New Jersey Association, May 27, at the apiary of Clarence B. Riker, in West Orange.

Paul L. Holcombe, New Jersey inspector, told more than fifty listeners that in his inspection of 3,100 registered apiaries he has found both sac brood and American foulbrood to be on the wane. He attributed the increasing knowledge among beekeepers as a vital factor in this situation.

Robert S. Filmer, associate entomologist, New Brunswick, described bee disease. Elmer G. Carr, of Pennington, conducted a demonstration of wiring.

New Jersey News Service.

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Coming Events in Indiana

Madison County Field Day, Anderson, July 29. Vigo-Clay Counties Beekeepers Summer Meeting, Terre Haute, July 29. Indiana State Fair and Honey Display, September 1-8.

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Cuyahoga County (Ohio), July 30

Cuyahoga County beekeepers will hold their summer round-up on Sunday, July 30, at the apiary of George Siedel, Strongville. A most interesting and unusual program has been arranged. The activities will begin with a basket picnic at 11 A. M. A number of officials, including Dr. Dunham and Mr. Reese, will speak upon problems confronting the beekeepers and will conduct open forums on timely subjects of vital interest. In addition, there are to be various demonstrations and an exhibit of A. F. B. by the county inspector.

J. M. Miller,
Secretary.

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Piatt-Macon (Illinois), July 16

Piatt and Macon counties are planning the fifth annual central Illinois beekeepers' picnic, on July 16. There will be a basket dinner, four or five good speakers, contests and games with prizes. Prizes will also be given for the oldest beekeeper, the lucky door number, the beekeeper with largest family attending, beekeeper coming the greatest distance. All beekeepers are cordially invited to come.

E. W. Switzer, Secretary
Piatt County Association.

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Two New Jersey State Meetings

Two field meetings for beekeepers are planned by the New Jersey Beekeepers Association for July. The first is a special one, on Saturday, July 15, at which Dr. J. N. Tennent, president of the Scottish Beekeepers' Association, Glagow, will be present. We will gather at the home of Miss Carrie Foster, on the Mendham road, one mile west of Morristown, N. J., at ten o'clock sharp. Dr. Tennent, Robert S. Filmer, and Paul L. Holcombe will speak. Bring lunch, which will be eaten at twelve o'clock. At one-thirty we will go to Karl Rist's apiary, 204 Hillcrest Avenue, Morristown, and examine the bees. Mr. Rist will demonstrate the foundation press. Spread the news and let's honor Dr. Tennent with a large gathering.

On July 22, the annual field meeting will be held at the state apiary, near Lebanon. Besides the breeding work in which Mr. Filmer is engaged, we will see the O. A. C. honey strainer in operation, the Brand cappings melter, a gasoline operated extractor, etc. It is planned to have Dr. Martin, director of the New Jersey Agricultural Experiment Station, present, also Dr. Headlee, state entomologist, and other state officials.

Follow the red arrows from either of two points on state highway No. 28, east of Lebanon. Those coming via Flemington may follow state highway No. 30 to a point seven miles north and follow red arrow through Round Valley to Lebanon, then turn east, or may go via Whitehouse. Bring your lunch. Light refreshments will be for sale on the grounds.

Elmer G. Carr,
Secretary-Treasurer.

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Southeastern, Kansas, July 16

The Southeastern Kansas Bee Association will hold their annual picnic July 16. All beekeepers and their friends are invited. This is the tenth annual picnic.

The principal speakers will be Dr. R. L. Parker, Manhattan; and Geo. W. Kinkead, Topeka. A basket dinner will be served at noon, which is to be followed by a good program from 1:30 to 3:30. Come and enjoy yourself. There will be plenty of iced water and iced tea.

Wm. Krueger,
President.

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Pennsylvania Meetings

The annual Pennsylvania State Beekeepers Association picnic will be held at Harvey's Lake, Luzerne County, August 26, all day, according to a brief notice from H. M. Snavely, secretary of the association. He also says that several counties of western Pennsylvania will hold a picnic and field day at Treesdale Farms, near Mars, Pennsylvania, and that A. T. Keil is chairman of the committee for this meeting. No date is given. Undoubtedly further information will be forthcoming in the August issue.

— o —

Madison County (Indiana), July 29

The annual Madison County beekeepers' field day will be held July 29, at the apiary of Charles Kelley which is located off old state road 9 one and one-half miles east to right, then first house north, and northeast of Anderson, by Bethany Chapel. An all day meeting and tour will start at eight-thirty at the apiaries of Clyde Waymire, northwest of Frankton, then to Elwood, Earl Bebee, then to Willis Tappen apiary, at Orestes, then to Kelley's for basket dinner, followed by honey show, baking, and other contests.

H. H. Sigler,
President.

— o —

Ohio State August 9-11

The Ohio Beekeepers' summer meeting is being scheduled on August 9, 10 and 11. These three-day meetings prove to be very instructive and are becoming more popular each year. Full details concerning our

summer program will be forthcoming for the August issue.

W. E. Dunham, Extension Specialist in Bee Culture.

— o —

Virginia State, July 26

The Virginia State Beekeepers Association will hold its annual summer picnic on July 26, in Miller Park, Lynchburg. This will be a basket picnic, and all Virginia beekeepers are asked to attend. An interesting program is in the making, and a good time is in store for all.

Henry W. Weatherford, Secretary.

— o —

Georgia Twentieth Annual Meeting

The Georgia association will meet in Waycross, September 13 and 14 to celebrate the association's twentieth anniversary. The first meeting of the association was held in Waycross and it is suitable that the anniversary meeting should be held there also. At that first meeting many beekeepers and interested state officials attended, and our first laws affecting bees and the beekeeping industry in the state were shaped and turned over to the legislature. From that meeting inspection service began and it has now grown to be one of the most outstanding in the South.

While at this writing the program has not been put in shape, we hope to have a good outline for the August issue of the Journal. We are planning, as in the first meeting, to have some of the state officials with us, so that they may see at first hand the need of strengthening our laws and the number of individuals affected.

Remember the dates, September 13 and 14, and make your plans to attend.

J. G. Rossman, Secretary.

— o —

Sioux City, Iowa, July 10-11

The Central States Beekeepers' Association will be guests of the Iowa Beekeepers Association at Sioux City on July 10 and 11. The local association cooperating with the Sioux Honey Company will serve as local hosts for this meeting.

The completed program will be available for distribution July 1. Beekeepers in Nebraska, South Dakota, North Dakota, and Minnesota may secure copies from the secretary of their state association. Beekeepers in other states may have copies by writing to the State Extension Service, Ames, Iowa.

— o —

Tidewater Association

The Tidewater Beekeepers' Association held an outdoor meeting at Mr. and Mrs. Pavlovetz's farm at Sunray on June 10, 1939. The farm was crowded with beekeepers from Norfolk, Portsmouth, Suffolk, Franklin and vicinity. Mrs. M. E. Pavlovetz owns about forty colonies of bees and has had much practical and theoretical knowledge in the beekeeping field.

There was a bit of unexpected drama when one of the colonies swarmed. The bees flew about uncertainly for a short time, then returned to the colony. The trouble seemed to be in the fact that the virgin queen had changed her mind and remained in the hive.

It was found that another young queen was about to emerge, so the beekeepers removed the queen from the cell. There was no fight, however, between the two virgin queens.

Mr. A. O. King, president of the association, gave a talk on recent developments in equipment, leading towards greater profits in beekeeping. He demonstrated the "King Board" which is an adaptation of a queen excluder, the device being used in two queen colonies. He also stressed the importance of bees as pollenizing agents for field crops and vegetables.

Justice M. E. Pavlovetz gave a short talk on the use of honey in bread making. Incidentally, the Hall Baking Company of Portsmouth, Virginia sells a crushed wheat bread which uses a honey formula. It is known as "Honey Crushed Bread." The next monthly meeting is tentatively arranged to be held at the home of O. C. White, Franklin, Virginia.

R. A. Hedgebeth.

— o —

New Zealand's Centenary

The year 1940 will mark the hundredth birthday of the white man's settlement in this land. To celebrate New Zealand's centenary, exhibitions re-enactment of historical events commence in November, 1939, and a big year and much excitement is expected.

In spite of New Zealand's multifarious native, nectar-bearing, flowers, there was no variety of the honeybee. The job of pollination, for which the flowers gave nectar so bounteously, was evidently carried out by certain kinds of flies and insects.

Actually the first bees to be brought to this country were brought by a lady, the late Miss Bumby, a sister of one of the missionaries.

Miss Bumby brought the bees, which were of the common black variety, from England in the ship "James." They were landed on March 13, 1839, at Mangunga, Hokianga, North Auckland. Others were brought from England in 1842. Many years were to pass before Italians were imported, not until 1880, when the late Isaac Hopkins obtained some from California. Three years later he imported some direct from Italy.

The progress made in beekeeping in New Zealand by no means represents a hundred years of effort. The Apiaries Act was not passed until 1906, and with the amending of the Act in 1913, which made registration of all apiaries compulsory, commercial beekeeping may be said to have commenced from this time. So progress has been rapid, and from small beginnings a large industry has been built up.

In honoring our pioneers, we must not forget those in the beekeeping field, and foremost among them, the late Isaac Hopkins, whose efforts brought much of the legislation that safeguards beekeepers today.

Time marches on!

T. T. Jones.

— o —

Program News of the Convention

The program committee for the National Honey Convention (November 7 to 10 at Sacramento, California) is ready to talk! The first day of the conclave belongs to the American Honey Producers League and the speakers will be expertly informed on the problems of marketing and organization. These subjects will continue through the morning session of the second day, after which the Apiary Inspectors of America will take hold of the reins. The theme of the third day is "Roll Call of the States." On this day we hope to present representatives from each state in the union as well as apiculturists from Canada, who can tell us about their local problems and how they are solving them.

After the reports of the nominating committees on the afternoon of the third day, the group will drive to the port of Sacramento and board one of the river boats, where an all night journey along California's inland waterway will carry us to Treasure Island. November 10th has been designated as Honey Day by the Fair Officials.

It is the hope of the committee to have fewer speakers this year and a great deal more discussion from the floor. This means that even if you don't receive a formal invitation to appear on the program, your presence and your ideas will be a valuable contribution to helping other men in your field.

As a general rule, committee reports and executive sessions of the various organizations will meet between 8 and 10 each morning. The formal programs will be from 10 to 12 and 1:30 to 4. This will allow ample time at the close of each day's sessions for visitors to do some sightseeing.

Sacramento is the capital of the state and the grounds and buildings in Capitol Park are very impressive.

Sutter's Fort, a few minutes drive from convention headquarters, was founded in 1839—just 100 years ago—by Capt. John Sutter, a Swiss adventurer, as the first outpost of white civilization in interior California. This Fort eventually became one of the richest trading posts in the West and when gold was discovered in 1848 it became a seething center of the glamorous gold rush days. The museum at the Fort preserves to posterity the old prairie schooners which blazed the first trails across the wilderness to the promised land; the ore wagons, the stage coaches, and the saddles and spurs of the riders of the Pony Express. For the ladies, there's a display of the sort of clothes you would have worn had you been fortunate enough to live during this fast-moving era.

The Crocker Art Gallery, also in close proximity of the headquarters, is open to the public and is worth the time it takes to view the many art treasures it houses.

This year, Sacramento is celebrating the 100th anniversary of the founding of their city. The historic Fort has been restored to its original condition and is inhabited by characters representing Sutter, James Marshall (discoverer of gold in California), Kit Carson, Bret Harte, John Fremont, Mark Twain, and others. The picturesque mining towns which sprang up following the epochal gold discovery, which altered the course of a democracy, have been revived with the construction of "Roaring Camp," a typical Mother Lode mining village.

There'll be a lot to see in California and more to learn when you come West this November to the Golden Jubilee Convention of beekeepers. Yes, fifty years ago—1890—the first National Convention was held. Beemen have come a long way since and the road ahead leads to even greater achievement.

Marie Whitcombe,
Davis, California.

—o—

Kane-DeKalb Meeting

An all day meeting on Sunday, May 21, of the Kane-DeKalb Beekeepers' Association was held at the home and apiary of W. Ritter, near Hampshire, Illinois.

In spite of rain which persisted and forced the use of Mr. Ritter's honey house as a dining room for a bountiful picnic dinner, the attendance was excellent, about 150 being there. The good weather in the afternoon made it possible for an outside gathering and the program.

Mr. Ritter, although producing some extracted honey, has been a comb honey producer for many years and is a disciple of good, old Dr. Miller, whose old home was not far away and whom Mr. Ritter visited many times.

An interesting program in the afternoon was in charge of the live wire president of the Association, C.A. Holmes and Mrs. Holmes, ably assisted by Mr. and Mrs. Carl Tudor, secretaries, and by the hosts of the day.

Included in the entertainment were short talks by Carl Killion, C. L. Duax, Edwin Peterson, Hoyt Taylor, S. S. Claussen and M. G. Dadant, and in addition, music, sleight of hand performing, and a number of prize winning drawings.

These all day picnic beekeepers' meetings are becoming more and more common and there is no doubt but the fact that the whole family attends, does increase the attendance of the gathering materially. The Kane-DeKalb County Association, particularly, has been extremely active and always seems to have a "dandy good time." At least the writer and Mrs. Dadant enjoyed it immensely. M. G. Dadant.

—ABJ—

Saving Caged Queens

Most beekeepers have had the experience of receiving queens through the mail at a time when, by reason of weather or other circumstances, they are unable to introduce them at once to the colonies for which they are intended. Some times in past seasons we have had queens in the house which we are quite sure we will need somewhere during the next few days—in supersedure season, that is—and have had them lie around until the queens died. Here are three plans that will save queens under such circumstances.

The first and simplest is to feed the bees and queen once a day with honey. It is routine practice now as soon as a parcel of queens comes in the mail to open it up, inspect the queens to see that all are alive, and then give them a tiny drop of warm honey. We put a saucer over the tea-kettle with a teaspoonful of honey on it, and when it is warm enough to be quite liquid, we take a toothpick and smear a very small quantity on the screen of the mailing cage. If the bees take this down very fast we give them another drop. If they take it only slowly it indicates that they are still well fed and do not require more. Great care should be taken not to give too much honey—just a very small drop on the end of a toothpick does the trick.

The second plan is that used by our Provincial Apiarist, Mr. Floyd, who operates as a part of his official duties a queen exchange, and a most useful service it is to a section such as Manitoba that uses so large a quantity of package bees. His method is to change the attendants. He has some overwintered colonies in his garden, and each day at noon he opens the cages in the house and takes out the old attendants, then closes them again with queens left in the cages, and then he goes out to the bees and catches enough young bees to take care of the queen. This is an excellent method of caring for caged queens and they will last a long time if so treated.

The third plan is to make nuclei. In our apiary we have a number of regular hives divided into three compartments by thin boards, and with separate entrances. Any time we have surplus queens we take a frame of honey, and one with some brood and well covered with young bees. We place these in the nucleus, make a hole through the candy so that the queen will very soon emerge, put the whole works in a nucleus, and the queen will be out and laying eggs when we want her. As soon as a queenless colony is found the entire nucleus is placed in it, separated from the old brood nest by a comb or two. We have never lost a queen, thus surrounded by her own bees and already laying eggs.

Hy. W. Sanders,
Manitoba.

—ABJ—

New Honey Plant For Mid-West

Members of our staff have been much interested in a honey plant which is a newcomer to Illinois. It is the winter cress or yellow rocket (**Barbarea vulgaris**) which has suddenly appeared in certain neighborhoods, from nobody knows where. It is a native to the colder parts of Europe and Asia, and was long ago introduced into this country in the region around Lake Superior. It was unknown to our state until quite recently but is now present in considerable abundance in some counties. It blooms in May and was noticeable along the roads where the yellow flowers made a bright showing, from Ottawa to the vicinity of DeKalb.

Ross Morrill has observed the bees working it freely at Batavia; but nobody seems to know, as yet, whether it yields much honey under our conditions. In foreign publications it is mentioned as an excellent honey plant, particularly for cold regions, so we may expect that under proper conditions it will add something to our bee pasture.

The American Bee Journal would like to secure more definite information concerning its probable importance here and will appreciate hearing from any beekeeper who has opportunity to observe the behavior of his bees on this plant.

Beekeepers Will Go Nautical In Sacramento

By Marie Whitcombe,

California.

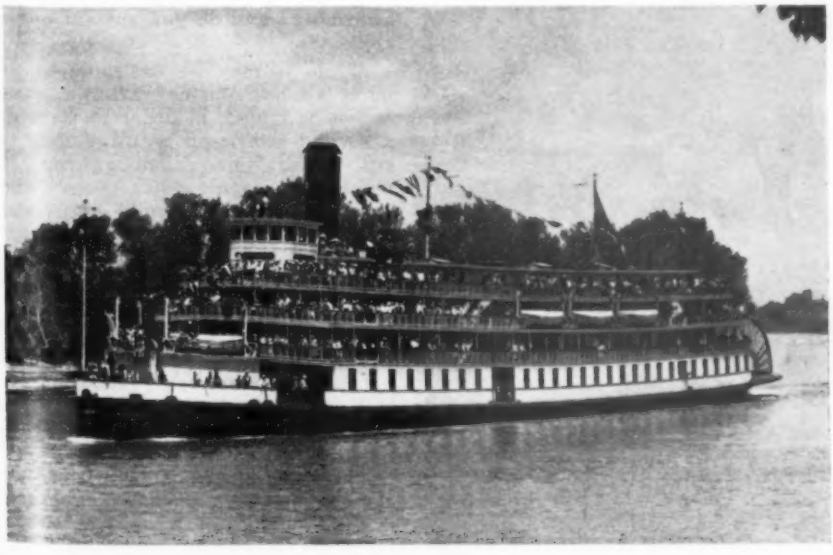
PLANS are being formulated for a genuine honest-to goodness old-fashioned river boat journey for all those who are fortunate enough to be able to attend the National Beekeepers Convention in Sacramento, California, November 7 to 10. The number of such river lines now in operation in the country may be counted on the fingers of your hand, and I daresay it will probably be the first and perhaps the last time any of you will have the opportunity to experience the keen enjoyment of a trip on a paddle-wheeler, whose history is written into the lore of the America our forefathers settled. The vessel will carry us from the capital city of California down the Sacramento River to Treasure Island, the site of the Pacific International Exposition; and as we step from this conveyance of early mode transportation onto the man-made island burdened with its agricultural, scientific, and cultural phenomena that thrill the modern world, it will be difficult to realize that in a single day we have traversed almost one hundred years in the development of the western empire.

The early navigation of the Sacramento river and the settling of interior California reads as enchanting as a tale from the Arabian Nights. Capt. John Sutter arrived in California in 1839 and secured a land grant from the Mexican government on what is now known as the city of Sacramento. Almost immediately he bought a 40-ton vessel from the Russians and began operations in 1841. This was really the beginning of commerce on the river. It was this same boat which carried word to San Francisco of Marshall's discovery of gold in 1848.

By 1850 there were 65 vessels plying out of Sacramento, engaged in almost daily runs from Oakland, Vallejo and San Francisco to the inland city. It was during this same year that a certain Capt. Nelson owning and operating a sloop called Northern Light, and a Capt. Anderson, owner of two sloops, decided to merge their assets. These two pioneers became the California Transportation Company, today the operators of the boats we will ride in to the world's fair.

Very early in the history of the company it was not unusual for them to move as many as 15,000 boxes of produce a day from small landing platforms along the river, haul them to San Francisco where several hundred peddlers and their wagons would be waiting in line to buy the fine fruits and vegetables grown in these valley sections. The Delta King and Queen, built in 1927, are comfortable in every way yet reminiscent of the days when hoop skirts, ten-gallon hats, and rickety stagecoaches were the rule rather than the exception.

There are many small apiaries all along the river, especially in the vicinity from Sacramento to Pittsburg. One of the larger outfits in the state—that one owned and operated by the Davis Brothers (Tom and Howard—you'll surely meet them at the Convention!) is at Courtland, a few miles south of the capital city. Although the Davis boys move about the entire valley, their headquarters are located at this river community. Brentwood, farther down the river and inland a few miles, is a thriving fruit center and many bees are moved in here each spring. Almonds bloom slightly earlier in this district than they do in some of the other fruit sections and thereby attract a number of beemen from the surrounding vicinity.



"Delta Queen," one of the river boats that will take beekeepers to Treasure Island on Honey Day, November 10.

ABJ

Honey From Second Crop Red Clover

Bees sometimes store a good surplus of honey from second crops of red clover. I watched them working last September and noticed that they sucked the nectar through a hole, probably cut by some other insect, at the base of the corollas or, in other cases, were forcing the proboscis down between the corollas and the calyx. Last autumn, however, they obtained barely colony maintenance from that source. Whether or not nectar is obtained in the same way when a good surplus is stored, I cannot say just now. It is more likely that a heavy flow allows the bees to reach the nectar from the top.

Bees work industriously on a wild vetch or tares during the summer through a similar hole in the base of the corollas and I am inclined to think that a lot of nectar is obtained from that flower, but it is not plentiful enough to be an important honey plant.

M. J. Rowland,
Dominion Experimental Farm,
Kapuskasing, Ontario.

ABJ

Mrs. Gaile M. Creger

We regret to report the death of Mrs. Gaile M. Creger, wife of the manager of the Lewis branch at Sioux City, Iowa. Mrs. Creger was 49 years of age and, with her husband, had reached that time of life when she could look forward to considerable enjoyment in the years to come. We send our sympathy to Mr. Creger in his misfortune.

Connecticut Beekeeping School

We beekeeping enthusiasts of Connecticut are just a little bit discouraged. The long rainy spell late last summer, and that hurricane that went wild through here last fall, together with a cold, late spring, finds many of us with empty hives and few swarms. On top of it all, our Grand Old Beekeepers are dropping out. On the whole, the depression has got us at last, and we'll soon pass out with the Indians.

Don't you believe it! Allen Latham has called for young blood to energize the fifty year old Connecticut Beekeepers' Association, and Cyril Simpson, a thirty year old, was elected president at the annual spring meeting, with a membership committee to perform the transfusion.

A similar spirit of new blood was injected into the old association in 1906 when Allen Latham and thirty other youngsters came in with fifteen of the old founders of the Connecticut Beekeepers' Association. This new "pep" made history. It brought the bee industry from the "gum era" to that of the standard hive, from the threatening extinction through disease to healthy control, from the "blacks" to the "Americanized Italians," from the wasteful comb to the profitable extracted crop, from the universally adulterated "buggy" honey to the sparkling, pure, well-packaged health food—our streamlined natural sweet. They have done well.

We (that is, Charles J. Rost, secretary; Roy Stadel, past president; and the writer, chairman of the Jubilee committee of the C. B. K. A.) were reminiscent last spring, and decided that what we needed was the old "bee fun" gatherings of thirty years ago, when a fellow would pick up another and drive several miles in his horse and buggy, just to visit my dad in the old bee yard.

Then, the idea was born. "Let's start a bee school in the old bee yard! Tell everybody what we are doing. The newspapers and bee journals will help. Let's ask some of the old timers to discuss timely topics; we can show our "Realm of the Honeybee," the film on Latham's queen rearing, and several other movies on bees. It's a natural—the answer to a need!" And history repeats itself, with new "pep" in the old association.

We are gratified to report a weekly attendance of from thirty-five to fifty novices at our beekeepers' school, where we had not dared to hope for more than twenty. Everyone expressed sincere appreciation for the helpful demonstrations and instructions given by the veterans. The procedure was as follows:

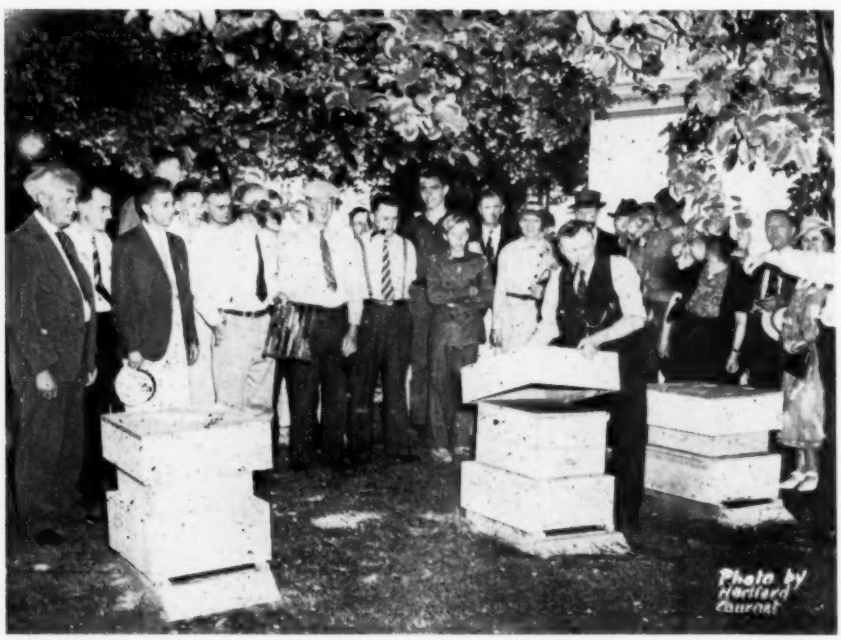
Promptly at two P. M., on Saturday afternoons, President Simpson projected appropriate movies, that is, on subjects relative to the topics to be discussed, following which a quiz brought out explanations, and later demonstrations were carried on in the bee yard. The instructors in the order of their service were W. H. Kelsey, of Bristol, state bee inspector; Chas. J. Rost, of Meriden; Elbra Baker, of Brooklyn; Roy and Mrs. Stadel, of Southington; Benj. Ellison, of Elmwood; Allen Latham, of Norwichtown, and Prof. L. B. Crandall, of the University of Connecticut.

The splendid thing about this whole project was that each of the instructors (who, by the way, are all members of the C. B. K. A.) traveled considerable distance and gave this valuable information free to persons who were all more or less amateurs.

Along with the beekeepers' school, a "cook-with-honey" demonstration was conducted every Saturday afternoon, in the kitchen of Mrs. M. Louise Yates, regional vice president of the National Ladies Auxiliary, and president of the Connecticut Chapter, for the benefit of the ladies who were interested in learning ways of using honey.

Further evidence of our Connecticut Beekeepers' Association energy was the annual summer meeting held at Secretary Rost's outapiary, in Meriden, June 24. Our meeting to be held at Connecticut State College during Farmer's Week, on July 28 is being planned by Prof. L. B. Crandall. There will also be a honey cookery contest at the college during that week, which is being conducted by the auxiliary. As this branch of the C. B. K. A. should be of great value in familiarizing the homemaker with the many advantages of using honey in her cooking, we urge every beekeeper's wife, sister and mother to enter her honey cookery in this contest, for which there are some good money prizes.

Claude L. Yates,
Hartford, Conn.



Practical apiary demonstration at the progressive new Connecticut Beekeepers Association bee school.

ABJ

Swarm Prevention

Questions frequently asked are **how do you keep your bees from swarming?** and **do you cut out queen cells?**

While it may be desirable to remove all but one cell after a prime swarm is issued, in order to forestall a second swarm, it is utter folly to try to prevent prime swarms by pinching queen cells. Bees with swarming fever will build cells faster than the beekeeper can remove them, not to mention the cells he overlooks.

Don't waste time, but use the more efficient method of raising the brood above a queen excluder and giving the queen empty combs below. It is not advisable to use foundation for this purpose, as you cannot get good combs drawn out below the brood. Separate the old and new brood chambers by means of a super or food chamber, always placing the brood at the top where it is easily accessible for removal of any queen cells that may be started within ten days. All colonies should be kept strong and

all treated at the same time. Do this work as soon as the brood nests become crowded and before the queen cells are started. Then forget swarms for at least three weeks, or until the brood chamber again becomes crowded, except, perhaps, to look through the tops. The time required for an efficient operator to do this work is about five minutes per colony. This plan is feasible only for use in connection with extracted honey production in standard hives.

If you are producing comb honey and wish to forestall swarming, do it this way: Remove all of the brood, not merely a part. Replace it with drawn combs or full sheets of foundation, shaking off the bees and using the brood to build up nuclei or to strengthen weak colonies. If foundation is used, place an empty super beneath (no frames) so that the cluster may become attached to the bottom bars, thereby avoiding stretching the foundation and reducing danger of bees absconding. Remove the upper rim as soon as the combs are built down to the bottom bars, and put on two or more section supers if there is a prospect for a honeyflow. By shaking off all the bees a stronger colony is obtained for comb honey than would be the case with a natural swarm, and you avoid the necessity of watching for swarms.

E. S. Miller,
Indiana.

—ABJ—

Mr. and Mrs. W. A. Chrysler

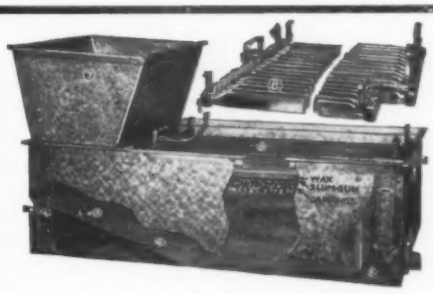
We regret to announce to our readers the recent death of Mr. and Mrs. W. A. Chrysler, who died within a few hours of each other. The Chryslers have been noted as big beekeepers and bee supply manufacturers in Ontario for many years.

—ABJ—

W. E. Hawkins

Many of our readers who know Kennith Hawkins, of the G. B. Lewis Company, at Watertown, Wisconsin, will sympathize with him in the loss of his father, W. E. Hawkins, who was 83 at the time of his death. He had been an Illinois beekeeper since 1908.

Mr. Hawkins was killed by an automobile near his home in Plainfield, Illinois on May 11. Burial was in Plainfield on May fourteen. His widow and one son survive.



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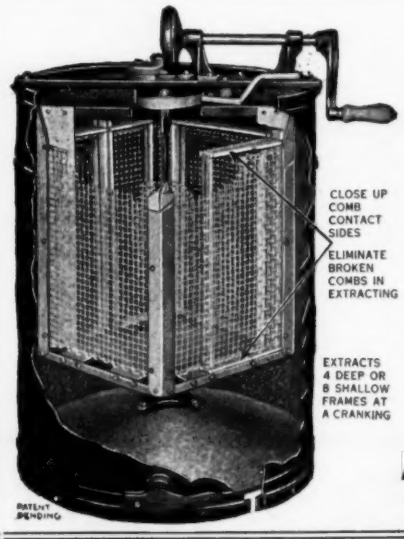
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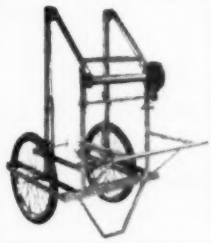

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Crop and Market Report

Compiled by M. G. Dadant

For our July Crop and Market report, we asked reporters to answer the following questions.

1. How is the crop so far compared to 1938?
2. How are the prospects in comparison?
3. What percentage of the 1938 honey is still in beekeepers' hands?
4. If new crop is harvested, how is the price offered compared to same date last year?

Crop Compared to 1938

Except in the southern section in California, no crop is yet reportable. In the Atlantic coast states, the crop so far has probably been a little better than last year but considerably less in Georgia and not quite 100 per cent in Florida. The balance of the South shows about usual conditions. Louisiana, however, has had too much rain for a good crop up until June 1 when conditions changed and bees were putting in honey very rapidly. In east Texas, conditions are up to last year, but the balance of the state shows very much below last year, except perhaps in the Rio Grande region. New Mexico and Arizona report almost drought conditions with very light crops which, however, is not much change from a year ago. It is in California that we see the great difference between 1938 and 1939. In most instances, the crop will not reach over 30 per cent of last year and in many cases beekeepers are having to feed their bees to carry them along. This is mostly because of drought.

In the north central states, bees came out of winter quarters in better than average condition, and the early honey sources have, in many instances, yielded well. We hear reports from Minnesota of bees being in condition to gather some honey in the supers from the dandelion bloom.

Prospects

Prospects in New England do not appear to be up to 1938 and the same is true of New York which claims only about 60 per cent of a year ago. Pennsylvania is not up to average. The Atlantic coast states still were expecting the possibility of a sourwood flow with at least the equal of last year's conditions. Georgia and Florida, however, do not look for a crop as good as that of a year ago, and the same conditions are revealed over most of the south, except that Louisiana, as mentioned before, seems to be progressing. Arkansas reports good conditions for the last half of the year.

East Texas is satisfactory and Oklahoma considerably better than a year ago, with the balance of Texas still undecided and not very great prospects. The same applies to Mexico and Arizona, with only the Imperial Valley of California showing anything like the usual conditions. The balance of the state looks very far from normal, with perhaps only 30 to 40 per cent of last year. The same is reported of Washington and Oregon. Rain might help.

Ohio and Indiana, although they have perhaps up to average, do not expect anything like the crop of a year ago, because of diminished acreages of the clovers. Michigan appears to be normal and in some instances is reported as better than last year which is hard to believe in view of their heavy crop. Wisconsin may perhaps be up to the 1938 level. Illinois may reach 1938, although sweet clover does not appear as good as before. Iowa will have probably the equal of last year with proper weather conditions. Southern and eastern Minnesota seems better than a year ago but northern and western are doubtful, compared to 1938.

In North Dakota, conditions are perhaps the equal of last year which was below normal. South Dakota is much below, particularly in the western sections which report about 30 per cent and in the east, perhaps 50 to 60 per cent. The plains areas of Nebraska and Kansas report a repetition of last year's conditions which resulted in almost a failure, although the eastern sections of these states will probably be much better than a year ago, with prospects of a fair crop. Throughout the entire plain states area, extending up to the Canadian border, there are many reports of heavy infestation of grasshoppers. It is a question whether or not they will cut a big figure in reducing the crop.

In the intermountain section, Colorado may be equal to 1938, and Idaho will probably be better, because last year's crop was short. Montana hardly expects the equal; neither do Utah and Nevada.

In the Canadian provinces, we find conditions equal to a year ago and even better in the heavy sweet clover area comprising Manitoba, Saskatchewan and Alberta. Ontario may be the equal and Quebec perhaps the same.

Percentage of 1938 Honey on Hand

Outside of the intermountain areas we do not find very large amounts of honey on hand. The New England states, New York and the entire Atlantic seaboard, including the entire South as far as California, seem to have no more than the usual amount of honey holding over.

When we get into the sweet clover regions of the Central West, however, conflicting statements come in because of the fact that many beekeepers have held most of their crop, whereas a large proportion of them have sold. There is perhaps, over that whole area 10 per cent of last year's crop still on hand. This is not excessive, and there seems to have been a better demand for it during the past six weeks.

The intermountain territory still is pretty well supplied, ranging from 10 per cent to 25 per cent of last year's crop still being held. Washington and Oregon also have a considerable amount of honey on hand; whereas in California, honey does not seem to be present in large amounts, especially in view of the short crop.

The Canadian provinces have fairly well disposed of their honey, although a moderate amount still remains which increases as you go eastward through the provinces.

Prices for Honey

The only encouraging reports we have are that orange honey in California is selling at from 1 cent to 1½ cents per pound above the closing prices of last year's crop and that other honey is maintaining its price satisfactorily in view of the low prices as quoted elsewhere. Even in the intermountain territory where considerable honey is held, there is a tendency to hold off until they see what the new crop amounts to. We do not believe honey can be expected to start off the new season at its price on the same date last year. There is no doubt but that there is a tendency to hold honey rather than to sell at the ruinous prices which have been in effect during the late winter and early spring season.

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The Postscript

Although our planting of Zofka red clover was winter killed at Atlantic, there is something of assurance in the fact that Dr. Martin's plant at Iowa State College came through uninjured, this in contrast to some other European red clovers which died in the same garden. A number of crosses of the Zofka clover with other strains of red clover have been made at Ames. The result of these crosses will be awaited with interest. Some notable work has been done at the Iowa station with forage plants, the best known of which was the discovery by Prof. Hughes of the annual sweet clover later named Hubam.

—ABJ—

A reader of this page inquires about marking queens. A tiny dot of bright colored enamel paint applied to the thorax between the wings makes it easy to find her. If carefully applied it is likely to remain during her lifetime. One must be careful to avoid getting the paint smeared over other parts of her body but if the job is rightly done it apparently does no harm to the queen. We have had some cases where it helped us to find her for two or more years before the colony was requeened.

The enamel can be had in small cans at any variety store for a few cents and a camel's hair brush to apply it can usually be found at the same place.

—ABJ—

The big bee meeting of the summer for the Missouri River Valley will be held in Sioux City on July 10 and 11. This is in the heart of the area of commercial honey production from sweet clover, and thousand colony beemen are no novelty here. The Sioux Honey Company is a cooperative organization of large scale operators and they are inviting the beemen from other sections to visit their plant and get acquainted with their members and their methods of doing business.

It is expected that there will be a large attendance and a lively time.

—ABJ—

Anise-hyssop once a very common plant in western Iowa has so completely disappeared that a long search failed to find any plants for our test plots. It is through the kindness of W. J. Bougen, of Valley River, Manitoba, that a few plants came to us from western Canada. Prof. Patterson, of Saskatoon, was unable to locate any plants but sent a few seeds from herbarium specimens. With this help we hope to reestablish the plant in its old habitat. If seed can be secured a larger area will be planted next fall. In the pioneer days this plant was so common that beekeepers harvested crops of honey from it here as they did later in western Canada.

—ABJ—

The use of the honeybee as a project in nature study by Mrs. Agnes Dawson, a teacher in Atlantic public schools, has been responsible for a marked increase in interest in honey in the homes of families from which her students come. Hardly was the project under way than we began to receive inquiries for honey and although we had none for sale were glad to refer them to others nearby. It would be a fine thing for beekeepers generally if such a project was under way in every school.

—ABJ—

George H. Rea, New York's popular extension teacher of beekeeping, was a welcome visitor to our experimental apiary at the time of his recent appearance on the short course program at Iowa State College. There was a good attendance at the short course, the room being well filled to the end of the last session. Rea's lectures were well received as were those of Russell Kelty at last year's sessions. Both men made new friends in Iowa when they came for the short course. The summer short course was new last year and the interest seems to indicate that it is likely to be continued.

The hive on scales at the experimental apiary at Pellett Gardens gained ten pounds on the first day of June. This brings an unusually early honeyflow from yellow sweet clover. Although the month of May was the driest on record with scarcely any precipitation, the weather was unduly warm and everything is earlier than usual.

It is hard to understand how there can be so much difference in the weather within such a short distance. April and May brought abundant rainfall at Hamilton, while at Atlantic, Iowa, less than three hundred miles distant May established a new record for drought.

—ABJ—

The first week in June brought good rains to this area which had so long suffered from deficient moisture. The change in appearance in the country and the attitude of the people is astonishing. It is to be hoped that rains will continue and that the privations of dry weather are over for some time to come.

At Pellett Gardens the electric pumps ran day and night through the month of May to save a portion of the berry crop. Irrigation from wells two hundred feet deep is expensive business but otherwise it would have been a hard year for the gardeners.

—ABJ—

Commenting on the origin of the custom of telling the bees when a death occurs, Hy. W. Sanders of Morris, Manitoba, suggests that in former days coffins were made to order and freshly varnished. When carried out of the house the bees would often alight on them, attracted by the resemblance of the varnish to propolis. Superstitious persons might readily assign to the bees an interest in the occupant of the coffin. This sounds like a reasonable explanation.

—ABJ—

A Wisconsin reader inquires as to the quality of honey from motherwort. Motherwort like catnip, is common in barnlots and around old building sites. Both are very attractive to the bees but the honey is usually so mixed with that from other sources that it is very difficult to learn much about the quality. My impression is that the honey from both is of fair quality but I have never been able to secure a sample of either that I thought was unmixed with that from other plants.

—ABJ—

Asparagus must be a good source of nectar judging from the way the bees roar over our field at the time when sweet clover is yielding. We have about an acre of asparagus and when it comes into bloom the sound of the bees indicated a real honeyflow. I am revising my opinion, expressed in American Honey Plants, that as a source of nectar it is unimportant. The indications here are that if grown in an acreage comparable to the clovers it might yield large crops of honey.

—ABJ—

We have a much larger plot of the yellow cleome in our test garden this season. The bees sought it so eagerly last year that it seemed wise to give the bees access to a larger area to permit better observation. Indications are that it will prove valuable to the beekeeper as a plant for waste or unoccupied lands.

We are endeavoring to secure definite information concerning a large number of honey plants by growing them in the American Bee Journal test plots. From time to time we hope to have something of value to report to our readers as a result of these tests. More than one hundred new plants have been added this season.

FRANK PELLETT.